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## Tutorial - Lesson 134: Middleware

We can begin with general agreement (thank heaven for small favors) that middleware is software, not hardware. Beyond that, however, just what is it exactly?

By Jonathan Angel  
01/05/2001, 7:39 AM ET

## Lesson 134: Middleware

by Jonathan Angel

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We can begin with general agreement (thank heaven for small favors) that middleware is software, not hardware. Beyond that, however, just what is it exactly? Some authors describe middleware as "the 'slash' in client/server," which is clever but not particularly helpful. Middleware can also be termed "programming that sits in the middle, connecting diverse (and usually preexisting) programs together."

Expanding either of these definitions, however, would suggest that communications software programs, network operating systems, Web browsers, Cisco Systems' Internetwork Operating System (IOS)—and a lot more—are all middleware. This is logically true, but will not get you far as you attempt to decipher vendors' data sheets. So rather than obsessing over an exact definition of middleware, I'll look at how the need for this type of software arose and review the types of solutions that have evolved.

## FROM SINGLE-TIER TO N-TIER

Until the mid-1980s, there was no such thing as distributed computing. If multiple users were connected, it was to a central mainframe or minicomputer. User terminals were simple "glass teletypes," performing no local processing, so there was little need for middleware as we have come to know it. This type of host-based environment has been dubbed

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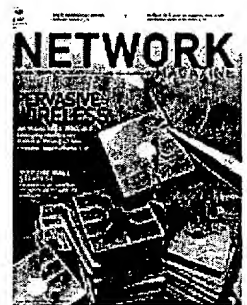
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single-tier computing.

As microcomputers and local area networks wormed their way into the business environment, data files could be shared via multiuser versions of standalone PC database products (dBase III was the market leader in the mid-1980s). While file and record locking were provided, these products essentially treated the LAN file server as if it were nothing more than a shared hard drive. As a result, large numbers of records, or even the entire database, had to be frequently moved across the network.

These problems led to the development of the classic client-server model, which is now called two-tier computing. Desktop clients handled a database application's user interface and logic, while a centralized server dished out selected records.

What tied the client and server together was Structured Query Language (SQL), which could be considered the first middleware. Database vendors could have employed a proprietary pipe to link their clients and servers; however, SQL had a proven ability to select database records precisely, thus reducing network traffic. Even more importantly, this open middleware standard allowed a database's user interface to be easily varied.

Clearly, two-tier computing was a success, providing more flexibility at the desktop while removing some of the load from the network and database server. However, the "fat client" approach left many desktop PCs struggling to keep up with the demands of an application's graphical user interface and underlying logic. In addition, new code had to be installed on desktops every time an application was updated.

To get around these new bottlenecks, designers moved more of their applications' logic to the database servers, storing procedures centrally. While this successfully alleviated the client burden and further reduced network traffic, it made it difficult for servers to scale well. Some observers in the mid-1990s went so far as to declare that client-server architecture had failed.

The cavalry soon arrived in the form of three-tier architecture (see figure). In this setup, the application logic is moved away from the client or the database server and onto a third server. Such an application server has many advantages: It improves database server performance; it makes it easier to update and improve logic without having to touch any clients; and it makes support of diverse client devices (PCs, Macintoshes, PDAs) simpler because their software need only include a user interface.

In today's environment, a nominal three-tier architecture easily becomes an n-tier architecture, with single or multiple application servers accessing multiple database servers to fulfill a request. The pipes between application servers and database servers may still be SQL. However, the pipes between the application servers and their clients are more likely to be one of the newer middleware types.



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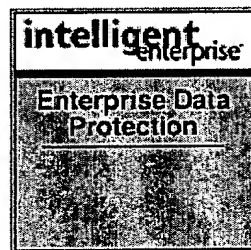
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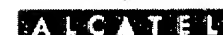
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## REMOTE PROCEDURE CALLS

Remote Procedure Calls (RPCs) are a primitive form of middleware that evolved from Unix environments in the mid-1980s. They're more or less what their name implies: By making a function call from one program, the author can invoke a process on a remote machine.

While conceptually simple, and readily available to Windows and even DOS, RPCs have many drawbacks. Because they operate at a low level of abstraction, they are tedious for a programmer to work with. Further, a typical RPC may require 24 distinct steps, several calls across a network, and much more processing power than a local procedure call. They don't scale well to a wide area network.

Another problem is that RPCs are synchronous; that is, the calling application is blocked from proceeding until it receives a response from the remote procedure. This can ensure data integrity in some cases; more often, however, it just causes unnecessary delays.

Unlike other middleware, RPCs are not generally sold as standalone packages.

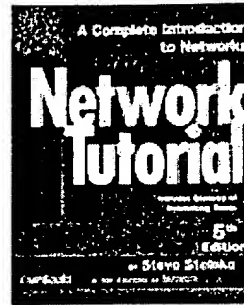
## TRANSACTION PROCESSING MONITORS

In a database system—not the only place middleware might be used, but definitely the most important—a transaction typically employs a series of commands, all of which must succeed or fail en masse.

The qualities a transaction must have are summed up by the acronym ACID (Atomicity, Consistency, Isolation, and Durability). Atomicity means that a transaction must execute either completely or not at all, leaving no partial results. Consistency means that the transaction moves the database from one consistent state to another. Isolation means that each transaction is isolated from the intermediate results that may be generated by others running concurrently. Durability means that once a transaction is complete, results will not be lost because of a system or storage failure.

Transaction Processing (TP) monitors are software processes designed to make sure these qualities are maintained. An early example is IBM's mainframe-based Customer Information Control System (CICS). Still important, CICS runs on a wide variety of platforms. Other TP monitors include Microsoft's Transaction Server (MTS), NCR's Top End, and BEA's Tuxedo (see [Web-Enabling Your Mainframe](#) February 1998).

TP monitors may have a client component, but they do most of their work on the application server, connecting to multiple database servers and performing load balancing as needed. Like RPCs, TP monitors have traditionally been synchronous, which makes them suitable where data integrity is of prime importance, but not so useful for real-time data feeds.



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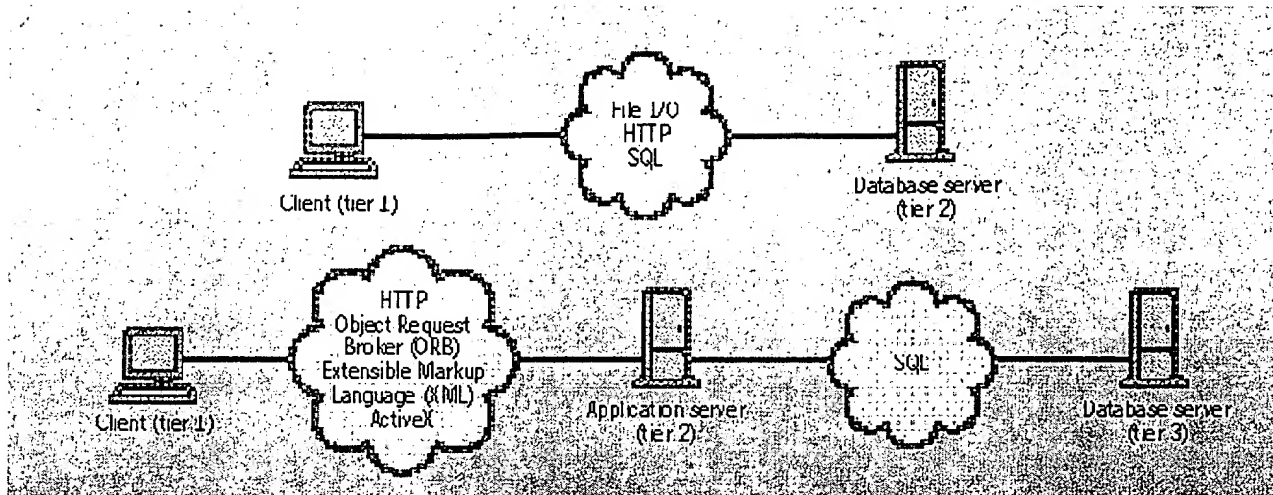
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**Tiering Up.** Moving from two-tier computing (top) to three-tier computing (bottom) improves performance, makes it easier to update application logic, and provides support for heterogeneous clients. Thanks to component-based middleware, three-tier easily becomes n-tier.

Resource Centre Manual > Section 6: Computers, electronic communication and databases

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## Section 6: Computers, electronic communication and databases



This section provides an introduction to computers and their use in resource centres. It includes:

- 6.1 Advantages of computers
- 6.2 Choosing a computer
- 6.3 Hardware and software
- 6.4 CD-ROMs
- 6.5 The Internet
- 6.6 E-mail services
- 6.7 The World Wide Web
- 6.8 Databases
- 6.9 Electronic resources
- 6.10 Review of database programs

Related sections include:

- 5 Organising the information
- 7 Information services

### **TIP: Up-to-date advice**

Computer technology is changing rapidly. This section provides a general guide only. It is important to discuss needs with local computer suppliers and software developers and obtain up-to-date advice before purchasing any computer equipment.

## 6.1 Advantages of computers

There are many advantages of using computers in larger resource centres, or smaller resource centres that have a large number of periodicals, serve many users based at a distance, or provide a wide variety of services. The main advantages of computers are:

- more information sources
- more opportunities for cooperation and networking
- increased access to the information in the resource centre
- increased efficiency
- more services

**More information sources** A computer with a CD-ROM drive can provide access to materials stored on a CD-ROM, including databases (containing descriptions of materials) and full-text (complete) materials. A computer linked to a modem can provide access to information available via e-mail and other Internet services, such as electronic newsletters and websites.

**More opportunities for cooperation and networking** A computer linked to a modem makes it easier to communicate with other resource centres, via e-mail. Sharing information among different resource centres can improve users' access to information and cut down duplication of effort.

**Increased access to the information stored in the resource centre** The main way to search for materials using a catalogue card system is by author, title, and a limited number of keywords. To add more keywords or other details would require more cards. This would require more work, and the catalogue would become larger and more difficult to keep up-to-date. A computer database enables materials to be searched using more keywords, or using other details such as series titles, publisher, year published or individual words from a title if the full title is not known, all without extra work.

**Increased efficiency** Information stored on a computer database can be used for different purposes. For example, details of materials entered onto a database when ordering them can be used for a catalogue, simply by adding classification numbers and keywords. The same records can be used to produce current awareness bulletins or resource lists.

**More services** A computer can be used to 'repackage' information held on a database, in the form of directories, resource lists or current awareness bulletins. Information held on the computer or available via the Internet can be adapted to produce locally relevant materials.



## 6.2 Choosing a computer

It is important to plan how a computer will be used, before going ahead and getting one. The first step is to think about whether a computer is really necessary. If the collection is small (up to about 500 materials), or consists mainly of books, a database (computerised catalogue) will not be necessary. However, a computer might be useful for accessing information from CD-ROMs or the Internet, or for tasks such as word-processing.

It is important to consider:

- what services the resource centre offers, and whether the users are within the same organisation or institution, or at a distance
- whether the conditions are suitable – if the power supply is poor, the computer will be out of

use much of the time, and if the telephone service is unreliable, access to e-mail and other Internet services will be disrupted

- whether a computer is affordable – the ongoing costs for anti-virus software and consumables such as printer ink or ribbons, paper, and diskettes can be expensive.

### 6.2.1 How to plan for computers

If it seems that a computer will be useful, the steps to follow are:

1. Analyse existing systems
2. Define the objectives
3. Carry out a feasibility study
4. Plan and set up the system
5. Test and evaluate the system.

#### 1. Systems analysis

Start by analysing (reviewing) any manual systems that are being used to organise and retrieve information. There might be an opportunity to improve these systems when they are computerised. Think about what the computer needs to be able to do. Do this for each function that you are considering using the computer for, such as word-processing, accessing CD-ROMs, using e-mail and the Internet, and setting up a database.

#### 2. Define the objectives

Write down what you want to be able to do. You need to have clear objectives so that you can choose the most appropriate hardware (equipment such as the computer and printer) and software (programs supplied with the computer or on CD-ROMs that enable the computer to function, such as word-processing or database programs). Clear objectives can also provide the basis of a funding proposal, whether you are seeking funds internally or submitting a proposal to an external donor.

#### 3. Feasibility study

Check whether a computer is feasible in terms of staffing, hardware, software and other costs.

- **Staff** Consider who will use the computer, what functions they will use it for, and whether the software to carry out these functions (such as e-mail, Internet or database programs) will only be available in the resource centre or whether it will also be available in other departments. Think about who will set up and manage e-mail, Internet and database systems and who will provide technical support – a member of staff or an external consultant. Also consider who will check the e-mail messages each day and who will enter data into the database.
- **Hardware** Consider what computer capacity is needed (memory, processor, hard disk, modem). Some functions, such as databases and desktop publishing, require a bigger capacity than other functions, such as word processing. Note the capacity needed by the function that needs the biggest capacity. Find out the capacity of any existing computer equipment. Consider whether this is sufficient or whether a new computer needs to be obtained. Consider what else needs to be purchased (see Section 6.3).
- **Software** Consider what software is already available, if any, for each of the functions that you want to use the computer for, and whether it is appropriate. Find out what experience and technical support is available within the organisation, locally, or nationally. For example, find out who uses the same software and could provide advice.
- **Other costs** Also take into account the running costs such as anti-virus software, diskettes, paper and printer ribbons, and other costs such as training.

#### 4. Plan and set up the system

It is important to think carefully about how to set up an e-mail and Internet system or design a database, in the same way as it is to plan the layout of the resource centre and the development of



information services. The systems must relate to the systems analysis and objectives, and be practical and easy to use.

### 5. Test and evaluate

After setting up an e-mail or Internet system or designing a database, it is important to carry out a test to ensure that they can do what they are intended to do. For e-mail and Internet systems, test the various functions, such as sending an e-mail message (to one person or a group of people) and receiving messages, attaching files, and searching and downloading information from the Internet. Make a note of how long it takes, how easy it is to use, and what support is provided by the Internet service provider (ISP) (see Section 6.5: The Internet). For a database, enter about 20 sample records (at least five records of each material type that the database will need to handle). Make a note of how easy it is to enter records for the various material types. Use these records to carry out functions that the database will be used for, such as searching, sorting and printing. These tests will enable you to evaluate the systems, and sort out any problems at an early stage.

## 6.3 Hardware and software

Computer specifications are continually changing, so it is important to obtain up-to-date advice before purchasing or accepting any equipment. It is recommended to choose a computer with a well-known brand name. These can be more expensive, but more reliable.

Regardless of changing specifications, the process for deciding what to obtain remains the same. It is important to decide:

- what the computer will be used for
- how many programs it will run
- how much data will be stored on the computer
- how fast the computer will need to work
- how the use of the computer might change or increase in the future.

The following equipment will be needed: computer with CD-ROM or CD-RW drive, printer, cables, back-up facilities, modem, UPS device, anti-virus software, and software for communications (e-mail and Internet), word processing and other functions as required.

**Computer** A fast, high-capacity computer with a CD drive will be needed for a resource centre planning to offer information services such as internal and external database searching, current awareness and repackaging services, or access to the Internet. The following is the standard specification for a computer for a resource centre in early 2003. It is meant only as a guide, as it will quickly become out-of-date.

533 MHz Intel Pentium 4 processor with 512Kb cache

256 Mb SDRAM (random access memory)

20 Gb IDE hard disk

17-inch screen colour SVGA (15.7-inch VIS .28 dot pitch)

20/48x CD-ROM drive

1 parallel port, 2 serial ports, 2 USB ports

UPS (uninterrupted power supply)

Back-up facilities: 3.5-inch diskette drive, and either 250Mb zip drive, 2–8Gb DAT drive, or CD-RW drive in place of CD-ROM drive

56 Kbs (kilobytes per second) modem

Windows 2000 Professional or Windows XP Professional operating system.

Guidance on buying IT equipment, including the latest recommendation for a computer specification (updated every six months) is available at:

<http://www.lasa.org.uk/knowledgebase>

A **CD-ROM (read-only) drive** can read information that has been recorded onto a CD-ROM, a disc that stores large amounts of data. This could be anything from publications, to databases, video or audio files. It can be internal (part of your computer) or external (a separate box that can be attached to your computer). Accessing CD-ROMs is very useful if you do not have reliable access to the Internet, as some resources, such as databases and journals, can be supplied on CD-ROM (sometimes for a fee).

**CD-RW (Read-Write) drive, or CD burner** Similar to a CD-ROM drive, a CD-RW drive can read compact discs (CDs), but has the added ability to record information on blank recordable CDs, and to record over (overwrite) data on an existing recordable CD. This is useful for archiving large amounts of data or to back-up the information saved on your computer, and can help economise on memory space in your computer. Recording over data on a CD requires a blank CD sold for this purpose, called a CD-RW (slightly more expensive than a normal blank recordable CD).

CD-RW drives are becoming a standard part of computer hardware. A computer without some sort of CD drive may cost a little less, but it can be more expensive to purchase and install one later on.

**Printer** One or more printers will be needed to print information from a word-processor, database, e-mail or the Internet. There are three main types of printer – laser printers and inkjets, which both use toner, and dot-matrix printers, which use ink ribbons. Laser printers are fast and produce high quality print, but they are expensive to buy and run. Inkjet printers are less expensive and produce reasonable quality print, but are also expensive to run. Dot-matrix printers are less expensive to buy and run, but are noisy and produce lower quality print. However, they can take continuous paper as well as single sheets, and are therefore convenient for printing out address labels, and large amounts of data, such as documents or database records for proof-reading.

**Cables** These are an important part of the computer equipment. The correct cables should automatically be supplied with the computer and any new piece of equipment purchased. However, it is important to check that all the required cables have been provided, such as cables to connect each piece of equipment to the computer and power supply.

**Back-up facilities** If you don't have a CD-RW drive (see above), you'll need plenty of floppy disks (1.4Mb) to make regular back-ups (copies) of databases and day-to-day work such as word processing. Media that can store more information than a floppy disk – for example, CDs (700 Mb) or tape such as a DAT (2–8 Gb) – can be useful for backing up larger databases and publications including illustrations and pictures. CDs, for example, can hold as much information as 550 floppy disks, and DAT drives can hold all the information on a computer. Zip disks (100Mb or 250 Mb) are quick and easy to use, but are significantly more expensive than CD disks.

**Modem** (MOdulator-DEModulator) This is a device that enables messages to be sent from one computer to another, via a telephone line. A modem can be a card fitted inside the computer (internal modem) or a small box next to the computer (external modem). The modem links the computer to a telephone line using a telephone cable. The same modem can be used to link more than one computer to the same telephone line over a 'local area network' (LAN).

Some modems can be used to send and receive faxes (known as fax modems). A fax modem makes it possible to communicate with people who have a fax machine but no e-mail, as it enables messages to be sent directly from a computer to a fax machine.

An important feature to consider when choosing a modem is speed. Faster modems cost more to buy, but save telephone costs and on-line charges of the Internet service provider (see Section 6.5). Modems with speeds of 56Kbs per second are becoming standard. The speed of a connection between two modems is limited to the speed of the slower modem. However, it is still worth buying a faster modem, since organisations are continually up-grading their computer equipment.

The speed is also affected by the quality of the telephone line, the computer, the Internet service provider's equipment, and the type of service you have contracted. Therefore, when buying a

modem, it is important to consider: the modem speeds that the Internet service provider can support; the bandwidths (transmission speeds) that the telephone company can support; and any local regulations about what kind of modem may be used (in some countries, telecommunications authorities do not allow users to connect modems to telephone lines, or have a list of 'approved' modems for use in that country). The relevant authorities or Internet service provider should be able to advise.

**UPS (Uninterruptable Power Supply)** This is a device that smoothes out fluctuations in the power supply, and provides power for a short time after a power cut. This means that work can be saved and the computer properly shut down, preventing programs and data from becoming corrupted. This feature is important if you live in an area that experiences electrical power surges or cuts, if only for a second. Other factors that contribute to power fluctuations and surges include: quality of the building's wiring, number of electrical devices, overloaded circuits, circuitry and wiring design.

**Anti-virus software** A computer virus is like a human virus – it causes damage and is not necessarily visible. Viruses can be introduced via files on floppy disks or e-mail attachments, or by downloading information from the Internet. Damage caused by viruses can include loss of data, erasing the entire contents of the hard disk, or multiplying files so that the hard disk becomes full and cannot operate.

It is important to check regularly that there are no viruses, by using anti-virus software. Anti-virus software needs to be updated at least every month, as new viruses are continually appearing. It is best to take out a subscription with an anti-virus program, so that updates are received automatically. As new viruses emerge it is important to update the software as soon as updates are available. It is important to include anti-virus software in the budget. It would be a false economy to omit it if everything were lost.

Internet users often try to warn each other about new viruses that are circulating. You may receive e-mail messages warning about a new virus. While these are sometimes useful, they are more often than not hoaxes – pranks to create panic and concern. See <http://www.symantec.com/avcenter/hoax.html> to check whether a particular warning is a hoax or a real cause for concern. Never open unsolicited email attachments from people you don't know.

**Communications software** E-mail software is needed to send and receive e-mail messages. It also allows messages to be stored, e-mail address lists to be set up, selected mail addresses to be recorded, and documents such as word-processed files or spreadsheet files to be attached to e-mail messages. Internet browser software such as Internet Explorer, Netscape or Opera is required for full Internet connection (see Section 6.5). It enables information on the World Wide Web to be viewed, downloaded onto the computer and printed.

For an older computer, Opera browser software might be more suitable. It works well with 386 and 486 computers and requires as little as 12mb of RAM (random access memory) and 1.7mb of free disk space. It costs about US\$40 (US\$20 for educational institutions; a version that includes advertisements and doesn't include e-mail support is free). More information is available on <http://www.opera.com>

Netscape Navigator is available free of charge from <http://channels.netscape.com/ns/browsers>, and requires 64mb RAM and 52mb of space on your hard drive. Internet Explorer is also free of charge, at <http://www.microsoft.com> (requires 16–32mb RAM, depending on your operating system, and about 12mb disk space). Check that your operating system is compatible with the browser you download.

**Word-processing software** Software such as Microsoft Word or Wordperfect is essential for day-to-day work such as correspondence, and for 'repackaging' information from e-mail, the Internet or a database. Word-processing software often comes with the computer ('bundled'). However, bundled software is not necessarily the most suitable. It is well worth finding out what software is most commonly used in your area, or by members of a network, and purchasing it separately if necessary.

**Portable Document Format (PDF)** A software programme called Adobe Acrobat enables you to create and read Portable Document Format (PDF) files, a worldwide standard for secure and reliable document distribution. PDF documents display and print with the formatting that the author created, including tables, illustrations and graphics, and are protected from unauthorized access and alterations. The Acrobat Writer (which can create these files) is available on the website for a fee. However, the Acrobat Reader (needed to read PDF files) is available on the website free of charge: <http://www.adobe.com>

PDF files are a common way of making documents available on the Internet and CD-ROM, as they can be read by any computer using the free Adobe Acrobat Reader software.

**Other software** Database software is discussed in Section 6.10. There are many other types of software that can be used for different functions. For example, desktop publishing (DTP) software such as PageMaker or QuarkXPress can be used to produce attractively presented materials, such as newsletters and display materials. PagePlus is a cheaper alternative, but less commonly used. Therefore before investing in it, you should ensure that your printer can access files produced using this software. Spreadsheet software such as Microsoft Excel or LotusNotes is useful for preparing budgets, schedules or tables. Web publishing software, such as Macromedia Dreamweaver or Microsoft FrontPage, makes creating attractive websites much easier.

**TIP: New or second-hand?**

If funding is not available for a new computer, it might be possible to use one that has been donated or passed on from another department. However, computer technology evolves quickly and an older machine may not be suitable for the tasks you need it to perform.

Check that the size of the hard disk, processor speed and memory (RAM) are sufficient to run the software that will be used, at a fast enough speed. Check the specifications of all the software you need to run – often, newly available software will not run on older machines. Add up the software specification figures for disk space, and compare this, plus figures for processor speed and memory, with the capacity of the computer. Computers running at or near capacity will often crash, losing unsaved data and wasting time.

When preparing funding proposals for computer equipment, it is useful to bear in mind that a higher capacity computer is needed for most resource centre work than for general administrative work. If the resource centre already has a computer and another computer is needed for administrative work, it makes sense to obtain a new computer for the resource centre. Pass the resource centre computer on for administrative work (having first checked that it can support the software being used for the administrative work).



## 6.4 CD-ROMs

A CD-ROM (compact disc read-only memory) can hold the same amount of data as about 550 floppy disks or 300,000 pages of paper. CD-ROMs are therefore very popular for storing databases and full-text materials. Many databases containing details of medical, health or development materials are available on CD-ROM – for example, African HealthLine, AIDSLine, Medline, and POPLINE (see section 6.9.5 for other useful examples). Most CD-ROM databases are updated regularly. The only cost is an annual subscription. An increasing number of free CD-ROMs contain collections of full-text documents such as e-Talc, and the Humanity Development Library (see section 6.9.5 for other examples). No special software is needed to use CD-ROMs. Using CD-ROMs to distribute and access information is useful in situations where using the Internet is costly, unreliable or unavailable.

#### Advantages of CD-ROMs:

- can provide access to large databases
- easy to search
- fast to use
- easy to transport
- durable; not easily damaged
- can be used on any computer with a CD drive
- available in multimedia (containing sound and movement) on a computer with multimedia facilities
- no telephone/internet service costs
- no reliance on telephone/internet access/availability
- fixed subscription cost.

#### Disadvantages of CD-ROMs:

- data may not be completely up-to-date
- subscription cost can be high.

## 6.5 The Internet

The Internet is a network of networks that links millions of computers around the world, using telephone lines. The networks are linked together so that they appear as a single network to the user.

A computer linked to the Internet can provide access to a wide range of services, including e-mail, viewing organisations' websites on the 'World Wide Web', taking part in discussion groups, accessing on-line databases, reading electronic newsletters and journals, and viewing video clips. The Internet is about people communicating and sharing information.

The services that are available depend on the type of connection to the Internet. A 'direct connection' or 'full access' provides access to all Internet services. An 'indirect connection' provides access to only some services, most commonly e-mail. It does not support graphics or provide easy access to the World Wide Web. However, services are becoming available that make it possible to access web pages via e-mail (see Section 6.7.5).

#### Access to the Internet requires:

- a computer linked to a modem (see Section 6.3)
- communications software (see Section 6.3)
- a subscription with an Internet service provider.

An Internet service provider is a company that provides the connection between the computer and the whole Internet network. When choosing an Internet service provider, there may be little or no option in some places. If there is a choice, it is useful to ask:

- What is the immediate connection charge?
- What are the on-going subscription charges and on-line telephone charges?
- What communications software is provided and at what cost?

- What technical support and training is provided and at what cost?

It is also worth asking local organisations which service provider they use and how they rate them.

The necessary communications software is often supplied by the service provider – sometimes free of charge – along with support in setting up and using it. It is best to talk to the service provider to decide which software to use. The software required for using e-mail and Internet services is developing rapidly and becoming much easier to use.

Some users, particularly in developing countries, do not have full Internet access because the cost of accessing files on the Internet can be high, telephones can be unreliable, and a greater capacity computer is needed. The Internet service provider can help to decide on the most suitable type of connection.



## 6.6 E-mail services

Electronic mail (e-mail) is a means of sending messages from a computer to one or more other computers. Messages are sent via a telephone line and delivered to the recipient within a few seconds, minutes, or hours, to over a day, depending on the service used and the reliability of the telephone connection. E-mail is a relatively cheap and increasingly popular way of communicating among individuals and organisations worldwide.

Different types of connections carry different charges and advantages. A dial-up connection is the most basic; usually, you are charged for the use of the telephone line for the duration of your 'session' on the Internet, plus connection charges and/or a standard monthly fee. Alternatively, if you live in an area with a good telecommunications infrastructure, you may be able to obtain a broadband (also called DSL (Digital Subscriber Line)) connection. Broadband may be quite expensive, but provides an 'always on', much faster Internet connection and may be more cost-effective if the Internet is used frequently.

An e-mail message can be a simple text-based message written directly in e-mail software, or it can include an 'attachment' consisting of a word-processed document, spreadsheet, database or graphics file, or even a software program. A simple text e-mail can be read by any e-mail software. However, an attachment can only be read by the same software in which it was prepared. The recipient therefore needs to have the relevant word-processing, spreadsheet, database or other software to read attached documents. See also 'Portable Document Format (PDF)', in Section 6.3.

### **TIP: Sending attachments**

If you are not sure which word-processing software is used by the person who is receiving the attachment, save the document as a rich text format (RTF) file, or a text file (TXT) before sending it. These files can be read by any word-processing software. A text file only includes the text of the document with no formatting. A rich text format file keeps basic formatting such as bold and underline

E-mail addresses indicate the user, service provider, type of organisation and (usually) the country in which the user is located. A typical e-mail address is Healthlink Worldwide's address:

info@healthlink.org.uk

info = the identifier or user name (this could be the name of an individual, a department or a service)

@ = pronounced 'at'

healthlink.org.uk = the domain name or organisation name

org = shows that it is an organisation (ac = academic institution, co = company, gov = government)

uk = country in which the organisation is registered

Each . is pronounced 'dot', so the above e-mail address would be pronounced:

info at healthlink dot org dot uk

#### Advantages of e-mail

- fast and relatively cheap
- easy to send the same message to more than one person
- text sent via e-mail can be copied into other documents
- does not require a separate telephone line (although the fax or telephone cannot be used at the same time as sending e-mail)
- does not require a separate computer
- enables faxes to be sent more cheaply than via a fax machine
- enables multimedia messages (containing sound and movement) to be sent if the computer has multimedia facilities
- makes networking easier.

#### Disadvantages of e-mail

- requires computer skills
- requires Internet access and associated fees
- requires training to use the e-mail system
- software can only be used in a few languages
- legal status of messages has not yet been tested in some countries.

### 6.6.1 Using e-mail

As well as sending individual messages, e-mail has a wide range of uses, including sending faxes, participating in electronic conferences or mailing list discussions, receiving newsletters and bulletins, and joining networks.

#### **Fax**

E-mail can be used to send and receive faxes directly, instead of printing them out and sending them via a fax machine. It is cheaper to send faxes by e-mail, because the messages travel faster, and the telephone charge is for a local call only. This facility requires a fax modem. It is also important to check that the Internet service provider can support sending fax over e-mail.

#### **Electronic conferences**

An electronic conference may also be known as a conference list, discussion list, discussion group, or discussion forum.

Electronic conferences allow a variety of people to communicate with each other to discuss issues, ask questions and exchange ideas and experiences. An e-mail sent to the conference address is automatically distributed to all its members. Some larger conferences have a 'moderator' who sees all messages before they are sent out to the member list, to ensure that they are relevant and appropriate to the conference.

A conference may focus on a subject area of interest, such as the prevention and control of HIV/AIDS; or it might have a geographic focus, such as library services in Asia or public health in

India; or it might be aimed at those with a similar job, such as health managers. A number of conference lists are available for library and information staff, such as the regional lists, Aflib, Asialib, Paclib and lists specifically for health information staff, such as AhilaNet and Medlib.

Conferences are often open to anyone interested in the topic. They can be subscribed to automatically by sending an e-mail message to the conference host. Details on how to subscribe to these electronic conferences are given in Section 6.9.4.

**TIP: Handling messages**

Some electronic conferences and discussion groups are very active and you may receive a number of messages each day, some of which may not be of interest. You could check with your service provider or other NGOs before subscribing. If you are going to be away from your e-mail for some time, you can unsubscribe for that period to avoid a large build-up of messages. Some very active discussion lists, eg AFRO-NETS, offer subscribers a weekly summary of messages.

Remember to keep the instructions on how to 'unsubscribe'. These are usually included in the welcome message when you first join.

**Electronic mailing lists**

The main aim of electronic mailing lists is to improve e-mail communication between a group of people working together. Electronic mailing lists may be used for short-term action planning or discussion before a meeting, or for ongoing general information sharing and discussion on a particular topic.

For example, Healthlink Worldwide has set up a mailing list for members of its Middle East Programme's regional management group. Members are located in different countries. They use the mailing list conference to plan meetings and newsletter editions. This 'closed' mailing list (open only to regional management group members) has an agreed purpose and a 'moderator', who is responsible for ensuring that it is used for its intended purpose, and for keeping a record of messages sent.

**TIP: Setting up an electronic mailing list**

You can set up your own electronic mailing list as long as you have an Internet service provider that offers this service (most do). A useful and easy-to-follow guide on how to plan, set up and use a mailing list, *From workplace to workspace: using email lists to work together*, is available on the Internet at <http://www.idrc.ca/books/848.html> or in print (see Further Reading section).

**TIP: Bellanet**

Bellanet (<http://www.bellanet.org>) is a Canada-based NGO that supplies services, advice and training to meet the needs of international development research communities and other development networks whose members are separated by geography. Bellanet provides advice and support to a range of partners on how to most effectively use web- and email-based tools for group dialogues and efforts toward the sharing of information.



**Electronic newsletters and bulletins**

Newsletters and bulletins are becoming increasingly available over e-mail as well as, or instead of, in print format. They are distributed in text-based format (without pictures or illustrations), and are often available free of charge. Some publishers prefer to distribute their publications over e-mail to speed up delivery times and to save on print and mailing costs, but offer the print version to those who cannot or do not want to receive the electronic version. Some publications are available electronically only, such as *HNPFlash* (for details see <http://www.worldbank.org/hnpflash>) and *WOUGNET Update Newsletter* (see <http://www.wougnet.org>).

The advantage of receiving newsletters and bulletins over e-mail is that selected articles or whole issues can be passed on directly by e-mail to others who may be interested. In addition, sections can be printed, copied to a word processor and adapted or reproduced for other materials.

It is worth considering how to store electronic newsletters and bulletins for reference by others. Key issues or articles could be printed and filed in the resource centre. They could also be stored in their own folder on your computer or on a disk.

Many journals and newsletters are also available on the Internet for those with full Internet access (see Section 6.7.4). Usually, you can sign up for regular notification of the latest issue and website address via e-mail, which will link to an electronic (html or PDF) version of the document on the publisher's website.

For details of over 150 free or low-cost international newsletters on health or disability related issues, see the Source Newsletters and Journals database at:

<http://www.asksource.info/databases.html>

**Electronic networks**

There are a number of networks in developing countries, which bring together people and organisations with common interests and a commitment to information sharing. By offering training, technical support and services such as e-mail, electronic conferences and discussion lists, and databases, these networks facilitate communication on issues such as peace, environment, social justice, international development, education and health.

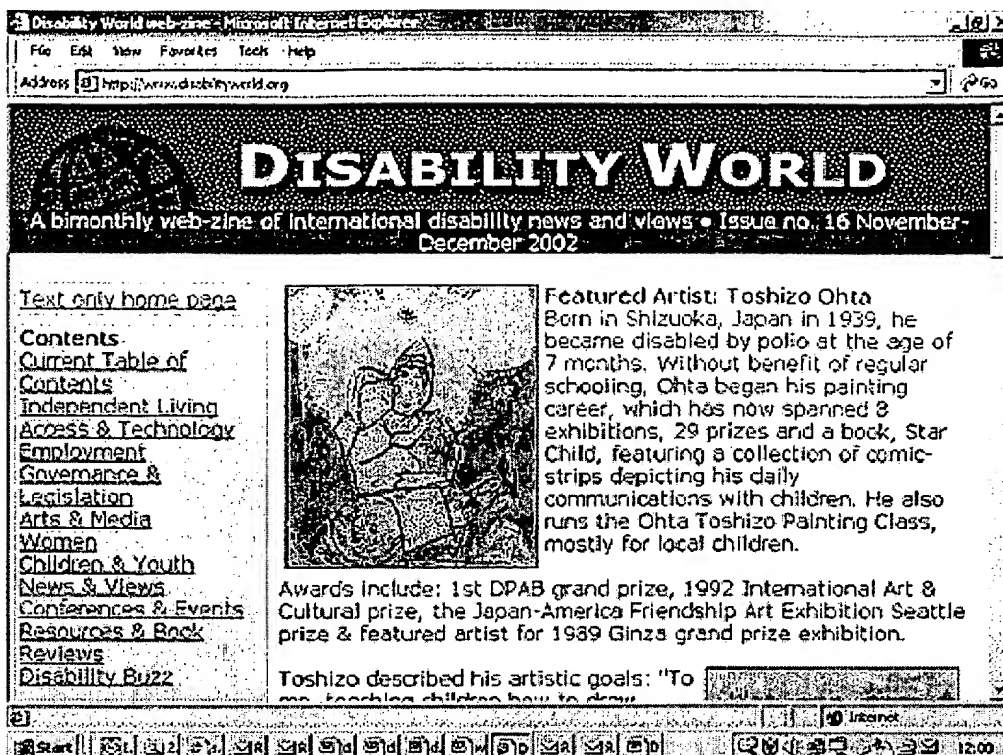
Examples of electronic networks include SANGONeT (South Africa), PSDN (Philippines), IndiaLink (India), Alternex (Brazil), Association for Progressive Communications (APC), Pactok, and SatelLife's HealthNet network. The American Association for the Advancement of Science website provides links to several good sources of information on electronic networking and connectivity issues: <http://www.aaas.org/international/africa-guide>



## 6.7 The World Wide Web

The World Wide Web (www or web for short) is one of the most popular features of the Internet. It is made up of millions of 'pages' of information. A web page is one document or file of information, which can contain text, pictures, and sound. It is possible to move from one page to another by clicking on certain words, phrases or graphics that are usually highlighted and underlined. These are known as 'hyper-text links'. They lead the viewer to related pages on the web.

The World Wide Web provides access to a vast amount of information on all kinds of topics. More and more organisations display information about their products and services on their website. Other useful facilities for resource centres include searching databases and accessing electronic journals and newsletters.



*Example of a web newsletter*

A website is a number of pages displayed by the same host computer. Each website has its own address or URL (uniform resource locator). An example of a typical web address is:  
<http://www.healthlink.org.uk>

<http://> = the transfer protocol which tells the web browser that it is connecting to the Web  
[www.healthlink.org.uk](http://www.healthlink.org.uk): = the domain name of the computer where the information is stored  
 org = shows that it is an organisation  
 uk = country code showing which country the site is registered in

### 6.7.1 How to find information on the web

The range of information available makes the web an exciting tool. However, it also makes it difficult to find exactly what you are looking for, and to know that the information is reliable. There are several ways of finding information on the web – by typing in a web address, following a link from another site, or using search tools.

#### Typing in a web address

If you know the exact address of the website or page, type this into the location or address box.

#### Following a recommended link from another site

Many sites include a list of recommended links to related resources on the web. You can save a lot of time looking around the web by starting from a reliable site and following the links provided. Someone will have already looked at a wide range of resources and included only those that seem useful. Examples of recommended websites are included in Section 6.9.1.

#### Using the search tools

There are a number of search tools on the web, known as 'search engines' or 'search directories'. These allow you to search the web for a particular word or combination of words appearing in a website. The search engine or directory will look through the web and display the addresses of those sites containing the word or words selected. These are often listed in order of relevance, with

those the search engine thinks are most relevant appearing first.

Each search engine includes instructions on how to search effectively. Take time to read these before you start. All search engines are slightly different and some include more advanced features allowing you to search for a whole phrase, use Boolean terms such as AND, OR, or NOT to combine words, or automatically look for words with the same meaning. Therefore, if you don't find what you're looking for, it is worth trying another one.

Advice about searching the web, and a comparison of the various search engines is available at: <http://www.searchenginewatch.com>

Recommended search engines include:

All The Web <http://www.alltheweb.com>

Google <http://www.google.com>

Lycos <http://www.lycos.com>

MSN Search <http://msn.search.com>

Yahoo <http://www.yahoo.com>

Some search engines are also known as search directories. A search directory is organised into subject areas, allowing you to search just those sites related to a specific subject, rather than the whole web. Often, the sites included within the directory have been assessed and selected by subject specialists; sometimes this is a service that larger organisations pay for. Using a search directory can produce more accurate results. Of those listed above, Yahoo and MSN Search are directories.

There are also multiple search engines, sometimes known as 'meta' search engines, which search across a number of search engines at the same time. This can save you time, however, a meta search engine can only use those search features that all of the search engines it covers have in common and therefore only perform the most basic kind of search. Meta search engines are particularly useful for broad and shallow searches, for assessing keywords quickly, and for getting familiar with the individual search engines that they cover. Examples are:

Flipper <http://www.flipper.com>

Ithaki <http://www.ithaki.net/indexu.htm>

Metacrawler <http://www.metacrawler.com>

Fazzle <http://www.fazzle.com>

Vivisimo <http://vivisimo.com>

### **6.7.2 How to evaluate information on the web**

There is a vast amount of information available on the web from all kinds of sources. Anyone can put a document on the web, unlike printed material, which has usually been edited or reviewed. It is sometimes difficult to know how accurate or reliable information on the web is. You need to consider:

- Who has provided the information? Do you or others within that field know of them? Are they known to be accurate, reliable and professional?
- Who has the information been provided for? Are the content and language appropriate for the audience?
- Are sources and references given? If claims and statistics are presented, are the sources reliable? Is there a bias present, and if so, is it stated?
- Is the site up to date?
- A clear guide to evaluating information found on the Internet is available at: <http://www.library.jhu.edu/elp/useit/evaluate>
- A number of other documents offering guidelines for evaluating various information

- resources, particularly those on the web is available at:  
<http://www.vuw.ac.nz/~agsmith/evaln/evaln.htm>

### 6.7.3 Internet databases

Increasingly, databases are becoming available free of charge on the Internet. These databases can be less straightforward and accurate to search than CD-ROM, though, they are becoming easier to use as Internet technology improves. They also incur telephone costs and there is a risk of being disconnected if telephone lines are poor. However, Internet databases can be a valuable source of information if CD-ROMs are not available.

For example, the National Library of Medicine (NLM) has put all the major commercial databases on their website, so that they can be searched free of charge. Source's bibliographic database is available free of charge from the website. For more information see Section 6.9.6.



### 6.7.4 Electronic journals and newsletters

Many journals and newsletters are now available in electronic format on the web, as well as, or instead of, in printed format. Some are available free of charge in full text, where the whole of each article can be read, printed or downloaded to disk. For others, only the contents pages of issues and abstracts of each article are available free of charge, and a subscription needs to be paid to view the complete articles.

The advantages of electronic journals or newsletters are:

- They can be searched by keyword or subject as well as by title, author, date and issue number, allowing users to find a specific article without knowing the complete reference.
- Articles can be printed off and read at users' own convenience.
- Articles can be saved to file to allow sections to be incorporated into other documents.
- References within the articles can be given with the full web address to lead readers to the source.
- A current annual subscription may give access to back issues of journals – though if the subscription has expired, access to the back issue may be lost.
- A journal website might include more than the articles themselves. For instance, the *British Medical Journal* website includes discussion groups, more in-depth articles, and readers' comments that are only available on the site.

Some electronic publications may appear on a website as PDF files. See 'Portable Document Format (PDF)' in section 6.3 for more information on creating and viewing PDF files.

For examples of electronic journals and newsletters, see Section 6.9.2.

### 6.7.5 How to access the World Wide Web via e-mail

It is possible to access web pages even without a full Internet connection. GetWeb, developed by SATELLIFE in the USA, is one of a number of services now available which allow you to request and receive the text only of web pages through a simple exchange of e-mail messages. You need to know the exact web address of the page or pages which you wish to access.

To use GetWeb, send an e-mail message to:

getweb@usa.healthnet.org

Type *GET* followed by the web page address in the text of your message (leave the subject line empty). For example:

GET http://www.healthnet.org

The text only of this page will automatically be e-mailed to you.

You can request more than one web page at a time by beginning the message with the command *begin* and completing it with the command *end*. For example, to request three web pages, you might send the following message:

begin

GET http://www.procaare.org

GET http://www.promed.org

GET http://www.edrug.org

end

A guide to using the GetWeb service, including its more advanced features, is available at:  
<http://www.healthnet.org/howtogetweb.php>

## 6.8 Databases

A database is information stored on a computer in such a way that it can be:

- **searched** through to find certain details
- **displayed** on the computer screen or **printed** onto paper in various styles
- **sorted** so that it can be ordered in different ways, such as author, title, subject and date of publication.

A database is made up of 'records', where all the information about an item such as a publication or organisation is stored. Records are equivalent to the cards in a card catalogue system. Each record is made up of 'fields', where information about different aspects of the item is stored – for example, the author or keyword, or the name of an organisation or its telephone number. Fields can be repeated to accommodate more than one author or keyword, or divided into 'subfields' to accommodate titles and subtitles, or the publisher and place of publication.

A database is faster and more flexible than a manual system. For example, searching a card catalogue is limited by the number cards that can be produced, and the way the information is presented can only be changed by re-writing or re-typing the cards.

The types of database most often used in resource centres are bibliographic databases and mailing list or 'contacts' databases.

A **bibliographic database** is like an electronic card catalogue. Each record contains details of materials, similar to the cards in a catalogue. Each field contains information about one aspect of a material, such as the author or title.

A **mailing list database** is like an electronic address book. Each record contains information about individuals or organisations. Each field contains information about one aspect of the individual or

organisation, such as their name, profession, organisation type, or address. A mailing list database can be used in various ways. For example, a resource centre membership database could contain information about members of the resource centre, including contact details and their areas of interest. A network database could contain information about resource centres and organisations that can be contacted for information on other subjects.

### 6.8.1 Standard database structures

It is important to have an initial outline of a database structure before selecting the database software, as the structure and use of the database may affect which program will be most suitable.

A database structure or format defines the fields, their names or numbers, whether they are repeated or subdivided, and often the format of the information in the fields.

It is possible either to use a standard database structure, or to develop one (see Section 6.8.2). There are several advantages to using a standard database structure. It saves the effort of designing a structure, it enables records to be shared with other organisations using the same structure, and it means that there will be good supporting materials. Sharing records with other resource centres can prevent duplication of effort and provide easy access to information about materials in the other resource centres. Therefore, if there is any possibility that the resource centre will want to share records with other resource centres, serious consideration should be given to using a standard structure. Otherwise a lot of time and effort will be needed to alter the structure or convert records.

Standard structures are designed to cover all standard needs. They include the option of adding new fields if required. Standard formats may include fields that are not required. These need not be used, or could be used later if requirements change.

Many standard database structures are available. The main international standard is MARC, but it is too complex for most resource centres. The Common Communication Format (CCF) is a more straightforward structure, and is suitable for storing information about people and organisations, and bibliographic information.

Some structures have been designed for specific subject areas. For example, the MIMBIS Manual is designed for development information. The World Health Organization (WHO) has designed a structure for the African Index Medicus (AIM). This structure or an adapted version of it is used by WHO country offices and health-related organisations such as ministries of health, and medical and health libraries. Healthlink Worldwide has developed database structures for contacts and mailing list functions, which are used by partner organisations as the basis for their own contacts databases and newsletter mailing lists. Both the AIM and Healthlink Worldwide structures are based on CCF.



### 6.8.2 How to design a database

If you need only a simple database or a very specialised database, you could create your own database structure, or adapt a standard structure. If you are designing or adapting a database structure, make sure that it relates to the systems analysis and objectives (see Section 6.2.1), and remember the tip: Keep It Simple.

The initial database design should be produced on paper, noting down each issue, and gradually building up a list of fields, content and format.

There are two main aspects to consider:

- the content of the records – the data to be entered into each field
- the structure of the records – the way in which the record is divided into fields, subfields, and repeatable fields.
- You will need to decide what to include in the database, and how the database will be used. Then you can work out the content and structure of the records.

For example, you might decide to include books, periodical articles and audiovisual materials in the same database, or you might decide to have a separate database for, say, audiovisual materials, depending on the size of the collection. If the collection is small, a single database for all materials would be appropriate, enabling all types of material on a particular topic to be located with one search.

Once you have decided what to include in the database, you will need to consider how much detail is required. This depends how the database will be used. For example, a database that will only be used for searching materials in the resource centre will only need to contain basic bibliographic information (author, title, place of publication, publisher, date of publication, keywords and classification number). For example:

#### WORLD HEALTH ORGANIZATION

Implementation of global malaria control strategy : report of a WHO Study Group.

Geneva : WHO, 1993

Keywords: malaria / prevention and control / health information systems / programme management

Location: HC7.2 WOR

A database that will be used to develop a resource list will need to contain additional information, including an abstract of each material and addresses of distributors. For example:

#### WORLD HEALTH ORGANIZATION

Implementation of global malaria control strategy : report of a WHO study group on the implementation of the global plan of action for malaria control, 1993-2000

(WHO Technical Report Series 839)

Geneva : WHO, 1993

57 pages

Keywords: malaria / prevention and control / health information systems / programme management

Location: HC7.2 WOR

Abstract: The report provides guidance for the implementation of the Global Malaria Strategy, and recommendations for the development of epidemiological and health information systems to assist in the planning, monitoring and evaluation of malaria control programmes. Emphasises the need for early diagnosis and treatment and the importance of community involvement.

Available from: WHO Distribution and Sales, CH-1211 Geneva 27, Switzerland.

Once the content and purpose of the database have been decided, it will be possible to work out how many fields will be needed, and what the field structure should be, including what fields need to be subdivided or repeated. The field structure will depend how the information is to be used. A database that will be used to develop a resource list could have fields for both abstracts and distributors, but an ordinary catalogue database would not need these. For the resource centre database, the distributor information could all be in one field. However, for a mailing list database each line of the address would either have to be in a separate repeat of the field or in a separate field, in order to print mailing labels and add the address to letters.

In a bibliographic database, an author's name is entered surname first, then first name, as this is the order recognised for catalogues and bibliographies. The field for names would be repeatable to

include up to three authors. In a mailing list database, the name is entered either first name first, then surname (as this is the way that a letter or envelope is addressed) or put into two separate fields. You can work out the number of fields required by writing down the list of fields, and assigning numbers to them (or names, depending on the software).

The structure is easier to remember if related fields are grouped together as follows:

- **resource centre information**, such as accession number and location
- **title information**, such as title and edition
- **responsibility** for the item, such as author, editor or meeting name
- **descriptive information**, such as where published, who published by, date published, number of pages and number of illustrations
- **subject and content information**, such as keywords, geographical coverage and abstract
- **acquisition information**, such as price, whether donation or purchase, and where obtained from.

You will need to know which fields will be used for searching. Fields that will be searched will need to be indexed. An index is similar to the index at the back of a book, and provides much more access to information on the records than a manual catalogue.

Before finalising the structure, you should test it to ensure that the database can do what it is intended to do. This can only be done after the software is selected and installed. However, the initial design process can help to decide which is the most appropriate software.

Once the software is selected, you can test the structure by entering about 20 sample records (at least five records of each material type that the database will need to handle) and noting how easy it is to enter records for the various types of material. You can use these records to carry out functions that the database will be used for, such as searching, sorting and printing.

### 6.8.3 Data entry guidelines

Once the database has been designed, guidelines need to be written on how to enter data into each individual field, to ensure that data is entered correctly. The guidelines should cover, for example, what to enter, and how to format and punctuate entries. It is useful to write the guidelines as a table.

Field name	Field no.	Guidelines	Examples
<b>Record number</b>	001	Unique number made up of 5 digits. The field must not be empty	18764
<b>Location</b>	900	Classification code followed by first 3 letters of author's name. If the author is an organisation, use the first 3 letters of the organisation name, not its acronym.	HC4.422 AGG AA3 WOR
<b>TYPE</b>	060	Type of document This field must not be empty	Article Manual
<b>DOCNO</b>	120	Document number, where given	WHO/DAP/94.1
<b>Title</b>	200	Title of book or article. Use sentence case. Separate main title from subtitle with the use of a : leaving a space either side of the :	Vaccination against pregnancy : miracle or menace?



		No full stop at the end This field must not be empty	
<b>Edition</b>	260	Edition of a book, unless first edition, abbreviate edition to ed.	2nd ed.
<b>Author</b>	300	Author(s). - Person's surname entered first in capitals followed by forename in initial capitals; up to 2 more authors in the same format - If more than 3 authors, enter the first one only and type 'et al' in the COMP field - First organisation's name entered in upper case with acronym in brackets - Up to 2 more organisations entered in initial capitals This field is repeatable	RICHTER, Judith BANDAWE, C R  WORLD HEALTH ORGANIZATION (WHO) World Bank

### 6.8.4 Database management

Database management is something that can easily be forgotten, but is an important aspect of having a database. Although data may be entered by any member of staff, the database should be managed by one person. The database manager is responsible for the accuracy and consistency of the data entered. Database management also includes backing up the database onto a floppy disk or zip disk to prevent loss of data, deleting unwanted files, and developing the database to meet changing needs.

#### **TIP: Backing up**

The database should be backed up every time a significant amount of data has been entered or edited. A significant amount is the amount that you would not want to have to re-enter or re-edit if the data were lost. Back-ups should be made on a rotational basis using at least two sets of disks. It is important to have rotational back-ups, in case one back-up becomes corrupt, or if there is a fault in the database before the back-up is made.

Carefully label each back-up disk with the name of the database, the date and its number in the set, for example, 'Disk 1 of 3'. Store disks in a cool, dry place out of direct sunlight. Keep disks away from magnetic and electrical equipment such as telephones, televisions, videos and bags with magnetic clasps. It is sensible to make two back-ups and keep one copy at home, or in another building, to protect them from fire or corruption.



### 6.8.5 How to choose database software

The differences between different types of database (or text retrieval) software are becoming more blurred as technology improves and new features are added to software programs. This section does not discuss specific programs, but provides guidelines for choosing software. A detailed look at three programs that are often used by libraries and resource centres is given in Section 6.10.

Before you consider what database software to use, you must be clear about what you need a database for (see Section 6.8.2). Think about the long-term needs of the resource centre, and how adaptable the program is, as it is more expensive in terms of both money and time to change to a different program later. Also consider what is happening in your area or field of work. If a particular program is widely used in your geographical area, or is used by a network that you belong to, and

it is affordable, it is also worth considering. However, do not decide anything until you have considered all other aspects of database software discussed in this section.

You can identify a suitable program in two stages. First, take four main aspects:

- variable length fields
- repeatable fields
- methods of searching
- flexibility in design and development.

Then, if the program looks suitable, you can look in more detail at the program's functions.

### 1. Main aspects

If the program is suitable in terms of the first two of these aspects, consider the next two.

**Variable length fields** are important for bibliographic information. Authors' names and titles, for example, are never a set length, so fields containing this information must be able to adjust in size. Fixed-length fields might be too small, so that data is lost, or too large, resulting in wasted disk space, which can slow down the operation of the database.

**Repeatable fields** are needed to accommodate multiple authors or keywords. Programs without the facility of repeating fields have either to place all repeats in one field, which causes problems for searching and sorting, or to create a linked database for these fields, which is unnecessarily complicated.

**Searching** is important, because improved retrieval of information is one of the main reasons for using databases in resource centres. The program needs to be able to cater for different levels of searching, from complex searches carried out by resource centre staff, to assisted searches, or simple searches for resource centre users. The program needs to be capable of retrieving information on known details such as authors or titles; finding materials on a particular subject area; finding individual words or phrases; and searching all fields at once, or individual fields, as required.

**Flexibility** means the ability to design databases to fit the resource centre's needs, and to make changes as required, such as adding and removing fields, or changing field names and record structures. It is important that continuing to develop the database is straightforward, and can be undertaken by resource centre staff, or other staff in the organisation. Otherwise the services will suffer, and the support required may not be affordable.

### 2. More detailed assessment

Once you have assessed the four main aspects of a program, you can carry out a more detailed assessment of the program's functions, including:

- |  |                           |
|--|---------------------------|
| • how easy it is to set up and develop | • languages               |
| • field identification                 | • data protection         |
| • data entry assistance                | • importing and exporting |
| • editing                              | • hardware requirements   |
| • indexes                              | • database size           |
| • searching                            | • software documentation  |
| • sorting                              | • help function           |
| • display, print and download formats  | • support services        |
| • user interface                       | • user groups             |
|  | • cost factors            |

**How easy to set up and develop** Designing and developing a database requires a basic knowledge of computers, and an understanding of how to organise information. Think about who

will design and set up the database. This will depend on the program selected, and the staff skills available within the organisation, or funding for external help. If the right type of program is purchased, very little outside help will be required. However, if the database is not designed by resource centre staff, make sure that resource centre staff are fully consulted during this process, to ensure that the database meets all the requirements of those searching and those managing the data.

When selecting a program, consider whether the program's design process is straightforward and requires few technical skills, or whether it is more complicated. Consider how easy it will be to modify the database to meet future needs, such as adding new fields, or to solve any technical problems, for example, if the database stops working properly.

If you employ a consultant, make sure that the consultancy includes providing good written guidelines and training in how to use the database. Also ensure that any training covers the skills required to adapt and develop the database for future resource centre needs.

**Field identification** When designing the database, think about how you will label or number fields, and how you will use repeatable fields and subfields. Systems for labelling or numbering fields may be important for sharing information with other systems (see Section 6.8.3).

**Data entry assistance** Data entry needs to be as straightforward as possible. Records can be entered more quickly and accurately if the program includes facilities for ensuring that data is in the right fields and the right format, and is spelt correctly. Look for the following features:

- **Setting up different data entry screens** for each material type can help prevent data entry mistakes, as most fields on these screens should contain some data, and there is less confusion between fields.
- **Record templates/record skeletons** are useful if you need to enter a lot of similar material. Regularly required data can be entered only once and used for any number of records, without having to be re-entered. The required data can be entered into any number of fields to build up the template/skeleton. To keep down the amount of data to be entered, it is useful to design different templates/skeletons for different types of material, or particular sources of information.
- **Default values** are useful if particular words or phrases are regularly required in a specific field, such as the type of material or language. Only one default value can be entered for each field, so templates/skeletons are a more useful feature than default values.
- **Field templates/input masks** are useful if the data needs to be in a specified format, such as upper case, or a fixed number or pattern of characters, or a specific date format. The pattern of the data is provided in coded form, and data not fitting the pattern will not be accepted by the program.
- **Substitution lists** are useful for standard information, such as organisation names and types of material. Once a list is set up, the abbreviation is typed and the rest of the word or phrase appears automatically. This saves time, and reduces the chance of errors, including spelling errors.
- **Pick lists** are words and phrases that may be pasted from a list, including data from previous entries or the index.
- **Validation/value lists** are like pick lists, but can only be used for fields where the content is controlled by a set of words or terms, such as subject, keyword, geographic fields, or type of material.
- **Spell checking** is increasingly available with database programs. It can be useful, especially for records with abstracts. However, it cannot replace record checking and other quality control processes.
- **Context-specific data entry help** is very useful, as it provides a quick way of checking the format to be used when entering information into each field. Help messages are entered by the designer and can be updated as needed.
- **Control over which fields must contain data (mandatory fields)** is a useful way of making sure that important information, such as the title or subject, is always entered.

**Editing** Alterations to the data in the database need to take up as little time as possible, so the options offered by the software are very important. The ability to copy and paste data within and across records is essential. Options to edit specified fields in a record range, the results of a search, or the entire database are also important. A 'find and replace' function is useful, but needs to be used carefully, as this function is not field-specific.

**Indexes** Computer indexes are similar to the indexes at the back of books, in that they help to locate records containing particular information, or written by a particular author. Browsing an index is similar to browsing the shelves of a resource centre. If something of interest is found, the record(s) can be viewed on the screen.

The type of indexing affects how easy it is to retrieve information. It is therefore important to check what types of indexing are offered - word, term/phrase, specific terms/phrases within a field. Word indexing is useful for finding individual words that may appear in different fields of a database. Term/phrase indexing is useful for indexing and retrieving keywords, and full titles. The ability to index selected words in an abstract is helpful, as indexing every word in an abstract can waste disk space and slow down the program.

Indexing is most useful where more than one type can be used at the same time. For example, word indexing combined with field/phrase indexing for the title field allows access to particular words in the title, as well as a complete title.

**Searching** There are several ways in which data can be searched:

- **Simple searching** means browsing the index, and selecting and combining terms from the index.
- **Boolean searching** means combining search terms using AND, OR, or NOT. This is sometimes provided in the simplified format of broader/narrower searching.
- **Phrase searching** (searching for a string of words), and proximity or adjacency of term searching (searching for words that are near each other) are important when looking for important words in the title, or for documents that cannot be well described by the use of subject keywords.
- **Truncation searching** is useful for finding words that have similar word stems, such as singular and plural terms, or words with similar meanings, such as computer, computing, computerised.
- **Synonym and soundalike searching** is useful for finding words that have similar meanings, or words that sound alike, such as words spelt in different ways.
- **Cross reference searching** is useful when a relevant term is found, as it enables the entire database to be searched immediately for other records containing that term.
- **Cross database searching** (searching more than one database at the same time) can be very useful, for example if there are separate databases for different types of materials, different resource centre sites, or for the catalogue and ordering systems. It can help to speed up the search process, or avoid duplicating materials or wasting time re-creating a record.
- **Saved searches** are a search strategy that can be saved and re-run at intervals, to retrieve any new records of interest to a specific user, or in a specific subject area.

**Sorting** It is useful to be able to sort data (for example, by date, subject, author or title) when carrying out searches, producing bibliographies, or viewing records on-screen. It is important to consider how many levels of sorting are available, and whether complex sorting is offered. For example, if there is no author, the record may need to be sorted by title instead.

**Display, print and download formats** It is important to look at how easy it is to create a print format, and whether it is possible to format text, so that an attractive printout can be produced without having to use a word processor. It is useful to be able to save records and reports as 'rich

text format' (RTF), so that formatted data can be imported directly into documents such as bibliographies and newsletters. It is also useful to be able to save data in HTML (hypertext mark-up language) format, for placing records as text on a website. Check also to see how easy it is to do mail merge and label printing.

**User interface** Does the program look pleasant on the screen? Is it easy to understand? Can searches be carried out without using written guidelines? However, even if the program is easy to use, it is a good idea to provide users with written guidelines, as these can also be used to tell them what the different databases contain.

**Languages** It is important that staff and users can understand the language used in the user interface as well as the data that is entered into the database. Check what languages the program is available in, and, if needed, whether data can be entered in non-Roman scripts, such as Arabic or Hindi.

**Data protection** If resource centre users and other staff are to search the database themselves, it is advisable to have some protection for the data. This could take the form of a search-only version of the software, or a password system.

Search-only versions allow users to search, sort and print. They are useful for resource centre users, and for making the database available to other resource centres and libraries. The other way to prevent database structures and settings from being accidentally altered is by using passwords. Passwords can be set in such a way that different functions are available to different users. For example, resource centre users could have a password that allows only searching, sorting and printing; resource centre staff could have a password that also allows them to enter data; and the database manager could have a password that also allows changes to be made to the database structure.

**Importing and exporting** You may not need to exchange data between the database and other software to start with. However, it might become important later on to exchange data with other resource centres, or transfer data to a new program. It is useful to choose software that can import or export data in several popular formats.

**Hardware requirements** Different software programs require different computer specifications. Some require more than the minimum stated specification to function well. To find out what specification you really need, speak to users of the software, not just the suppliers. Work out what capacity hardware (hard disk, memory, and processor speed) you need to run the software. Do you already have this capacity, or do you have a computer that can be upgraded, or will you need to obtain a new computer?

**Database size** There is usually a top limit to the size of a database file, or the number of records that can be stored, and the maximum number of fields that can be created. Consider whether these are sufficient for the resource centre's needs. This will depend on the purpose of the database (see Section 6.8.2).

**Software documentation (user manual)** Is the manual easy to use? Is it written in non-technical language? Are there any additional materials to help resource centre staff to use and understand the software?

**Help function** Is on-line help available with the program by clicking on the help menu? This is important, as commercial manuals to support the software are usually expensive, and may not be available.

**Support services** Check that the software supplier is stable, both financially and in relation to their trading history, i.e. they are not going to disappear overnight. It is also worth considering their technical experience, and whether they can provide training, troubleshooting services, and software updates.

Find out:

- who provides and supports the software locally
- what experience they have
- what services they offer
- how many other users they are serving.

Also find out how often the software is updated. How much does it cost to upgrade? Can existing databases be easily incorporated into the new upgrades? Look out for help services that are accessible via e-mail and the Internet.

**User groups** Technical support contracts can be expensive, so it is good to keep in touch with any user groups. Ask your software supplier, staff from related organisations, and members of local networks for details of software support groups.

**Cost factors** It is essential to consider the cost of:

- initial software purchase and upgrades
- vendor/consultant support
- training
- time required to become familiar with the software.

Make sure that you budget for adequate initial training and follow-up training in more advanced features. Remember, the more complex the software, the more time will be required for staff to become familiar with it. The familiarisation time must be taken into consideration, as less time will be available for other tasks during this period. Weigh up the cost of initial and follow-up training against the workload of the resource centre staff, and the importance of providing up-to-date information services.



## 6.9 Electronic resources



This list includes:

- 6.9.1 websites

- 6.9.2 electronic journals and newsletters
- 6.9.3 on-line training
- 6.9.4 electronic conferences
- 6.9.5 databases and other resources on CD-ROM
- 6.9.6 databases on the Internet
- 6.9.7 image collections on the Internet

### 6.9.1 Websites

#### **The African Publishing Companion: a resource guide**

<http://www.africanpublishingcompanion.com>

A resource that facilitates access to a wide array of up-to-date information relating to African publishing. It provides an extensive bibliographic survey of literature on the key issues and topics in African publishing, with an emphasis on literature published over the past five years. Over 1,600 cross-referenced entries about African publishers and the book trade – including African publishers' websites, African booksellers, dealers and distributors in African books, African book trade associations, etc.

#### **BUBL**

<http://bubl.ac.uk>

A website for libraries which has eight main components: *LINK*, a catalogue of Internet resources; *Journals*, offering the contents, abstracts or full text of current titles; *Search*, with ways of searching BUBL or the whole Internet; *BUBL UK*, an index to UK institutions; *Mail*, which takes you to available mailing lists and their archives; *Archive*, holding old BUBL files; and *Admin*, providing information about BUBL itself.

#### **Center for Disease Control (CDC) National Prevention Information Network (NPIN)**

<http://www.cdcnpin.org>

Makes available a variety of Internet services to share and distribute information and materials on HIV/AIDS, sexually transmitted diseases (STDs) and tuberculosis for people and organisations working in prevention, health care, research, and support services. Provides a list of publications and materials which can be ordered on-line; links to on-line databases; a poster gallery; the *Prevention News Update* (e-mail bulletin) and a dedicated Spanish section.

#### **Communication Initiative**

<http://www.comminit.com>

Provides information on communication and development experiences and thinking. Includes communication and development news items, base line data from the development and communication sectors, the electronic magazine *The Drum Beat*, programme descriptions, evaluation data and methodologies, planning methodologies, commentaries, an extensive listing of publications and reports, links to programmes and organisations in the development and communication sectors, and listings of consultants, training opportunities, vacancies, and events. A special health 'window' is available which focuses on information on health and health communication for development (<http://www.comminit.com/healthcomm>).

#### **CulturedMed**

<http://www.sunyit.edu/library/html/culturedmed>

A website promoting culturally-competent health care for refugees and immigrants. Includes approximately 30 bibliographies covering different health beliefs or ethnographic information about various ethnic groups, and links to dictionaries, databases, statistics and organisations that deal with various health topics and refugee groups.

#### **ELDIS**

<http://www.eldis.org>

The Electronic Development Information System (ELDIS) is a directory of electronic sources of information, including on-line databases, CD-ROMs, e-mail services, electronic discussion lists, and Internet sites covering issues around health and development, the environment and countries in

the South. A number of full-text materials are available, as well as links to related organisations, libraries and reference sources.

### **ERC: The Manager's Electronic Resource Center**

<http://erc.msh.org>

The Manager's Electronic Resource Center (ERC) is an electronic information service produced by MSH (Management Sciences for Health). The site gives access to relevant, up-to-date management information and tools specifically tailored to meet the needs of health service managers. Features include: ERC member database; library; calendar of events; electronic discussion lists. Also available in Spanish and French.

The ERC can also be used by those with e-mail access only. To find out how to do this, send an e-mail message to [erc@msh.org](mailto:erc@msh.org)

### **Global Health Network**

<http://www.pitt.edu/~super1/assist/sum.htm>

A global 'Supercourse' which has been designed as an Internet-based distance learning resource for medical, nursing and allied students who are beginners in epidemiology, global health and the Internet. Can be used to train students. You can also contribute to the Supercourse as a reviewer, lecture developer or translator.

### **Healthlink**

<http://www.healthlink.org.za/hlink>

Healthlink is a project of the Health Systems Trust, established to help meet the communication and information needs of health workers in South Africa. It offers links to a range of Internet resources, including its own discussion lists, newsletters, documents and services. It is a reliable source of information about health and health policy developments in South Africa, and serves as a channel for sharing health systems research results and recommendations.

### **IDRC**

<http://www.idrc.ca>

The International Development Research Centre was created by the Canadian government to help communities in the developing world find solutions to social, economic, and environmental problems through research. Provides links to databases, *IDRC Reports* magazine, IDRC publications catalogue, including the full-text of some publications, information on meetings and workshops.

### **INASP Health Links**

<http://www.inasp.info/health/links/contents.html>

An internet gateway to selected websites that are of special interest to health professionals, medical library communities, publishers and NGOs in developing and transitional countries.

### **Johns Hopkins Center for Communication Programs**

<http://www.jhuccp.org>

Covers topics such as adolescent health, HIV/AIDS, breastfeeding, counselling, environment, health care, maternal health, reproductive health, training, and women in development. Features include databases, discussion lists, links to related sites, full-text journals, field reports and other publications on health communication. Also available in French and Spanish.

### **OMNI (Organising Medical Networked Information)**

<http://omni.ac.uk>

A gateway to Internet resources in medicine, biomedicine, nursing, public health, health management and related topics worldwide. All resources have been filtered, catalogued, classified and subject-indexed to provide access to those sites which are considered relevant and of good quality.

### **Rehydration Project**

<http://www.rehydrate.org>

A comprehensive source of information and resources on diarrhoea prevention and treatment, oral



rehydration therapy and breastfeeding, plus facts, statistics and frequently asked questions (FAQs). Resources include the newsletter Healthlink Worldwide (formerly AHRTAG) newsletter, *Dialogue on diarrhoea* with subject index, and links to related sites.

### **SATELLIFE**

<http://www.healthnet.org>

Provides information about the activities and services of SATELLIFE, which is an international organisation that uses Internet technology to serve the health communication and information needs of developing countries. Focuses on public health, medicine and the environment. Hosts discussion groups and e-newsletters. Links to a number of health-related electronic conferences managed by SATELLIFE, and to disease-specific information.

### **Source International Information Support Centre**

<http://www.asksource.info>

Provides access to the Source databases on international health and disability issues, and signposts to other information relevant to those involved in health and disability in developing countries.

### **University of Zambia Medical Library**

<http://www.medguide.org.zm>

Provides a guide to health resource directories, medical journals (some full-text), health organisations, National Library of Medicine databases, and health news, including a link to Reuters Health Information Service (free access).

### **WHO Statistical Information System**

<http://www3.who.int/whosis/menu.cfm>

A guide to health and health-related epidemiological and statistical information available from the World Health Organization, and elsewhere. Provides links to Ministries of Health and other relevant, related sites.

### **World Health Organization (WHO)**

<http://www.who.int>

A comprehensive source of information on international health. Includes details of WHO programmes, activities and services. A catalogue of WHO publications is included with the option to order titles directly over the Internet. Provides links to other sources of health information at an international and regional level.

### **WWW Virtual Library**

<http://vlib.org>

Provides access to websites covering topics such as agriculture, communications, education, information management, regional studies and others. Many pages are written in an easy-to-follow style with lots of descriptions and personal commentary.



## **6.9.2 Electronic journals and newsletters**

### **1. Lists of electronic journals**

#### **BUBL Journals**

<http://bubl.ac.uk/journals/publishers.html>

A selective list of the websites of major journal publishers.

#### **FreeMedicalJournals.com**

<http://www.freemedicaljournals.com>

Provides links to 900 free medical journals, including French, German, Spanish and Portuguese titles.

#### **FreeBooks4Doctors.com**

<http://www.freebooks4doctors.com>

Provides links to approximately 600 health-related books in html or PDF format, in whole or in part.

### **Health InterNetwork Access to Research Initiative (HINARI)**

<http://www.healthinternetwork.org/index.php>

The Health InterNetwork Access to Research Initiative (HINARI) provides free or nearly free access to the major journals in biomedical and related social sciences, to public institutions in developing countries. Developed by WHO to provide equitable access to health information.

### **INASP (International Network for the Availability of Scientific Publications)**

<http://www.inasp.info/peri/index.html>

The Programme for the Enhancement of Research Information (PERI) is a programme for the delivery of scientific and scholarly information through electronic means, developed with research partners and university librarians in developing and transitional countries. Includes full text online journals, current awareness databases and document delivery of major scientific, technical, medical, social science and humanities materials from a wide range of sources.

### **Source Newsletters and Journals Database**

<http://www.asksource.info/databases.html#news>

Holds details of over 150 international newsletters, magazines and journals relating to health and disability issues which are available free or at low cost to readers in developing countries. If published on the web, you can link directly to the full text of the newsletter.

## **2. Electronic journals and newsletters**

The following electronic newsletters and journals are available on the Internet. They offer the complete text of articles and, in some cases, added features and background reading relating to them.

### ***African Journal of Reproductive Health***

<http://www.hsph.harvard.edu/ajrh>

An international journal publishing original research, comprehensive review articles, short reports, and commentaries on reproductive health in Africa.

### ***AIDS Journal***

<http://www.aidsonline.com>

An international journal publishing the latest research on HIV and AIDS.

### ***Asian-Pacific Newsletter on Occupational Health and Safety***

<http://www.occuphealth.fi/Internet/English/Information/Electronic+journals>

A newsletter published three times a year dealing with occupational health and safety matters in the Asia-Pacific area.

### ***British Medical Journal (BMJ)***

<http://www.bmj.com>

The journal of the British Medical Association.

### ***Disability World***

<http://www.disabilityworld.org>

A bi-monthly magazine on international disability news.

## **3. Newsletters available over e-mail**

### ***HNPFlash***

The Human Development Department of The World Bank, Washington USA

<http://www.worldbank.org/hnpflash>

E-mail: [hnpflash@worldbank.org](mailto:hnpflash@worldbank.org)

A monthly electronic newsletter on trends and developments in education, health, nutrition, population, and reproductive health. The newsletter announces new technology, new publications, project updates, conference and training information, job vacancies, grant opportunities and information on other related electronic resources available on the Internet. In the form of an electronic archive, the service also makes a number of related documents available over e-mail, which can be automatically requested by sending a message following the straightforward instructions given in each bulletin. Other organisations can make their documents available over this archiving service. You can request to subscribe to the HNPFlash newsletter automatically by sending a blank e-mail message to [join-hnpflash@lists.worldbank.org](mailto:join-hnpflash@lists.worldbank.org)

### **JHPIEGO TrainerNews**

Johns Hopkins Program for International Education in Reproductive Health (JHPIEGO)

<http://www.reproline.jhu.edu/english/6read/6issues/6jtn/jtn02.htm>

A monthly electronic newsletter on current reproductive health training news; contraceptive briefs, announcements about reproductive health and training-related programmes and activities, and tips about Internet and CD-ROM resources of interest to reproductive health trainers. The information is targeted at professionals working in low-resource settings. To subscribe, send an e-mail to: [listserv@community.jhpiego.jhu.edu](mailto:listserv@community.jhpiego.jhu.edu). In the body of the message, type: subscribe jtrainernews your name. No words are needed in the subject line of the message. Do not include your email address or signature in the body of the message.

### **WOUGNET Update Newsletter**

Women of Uganda Network (WOUGNET), Kampala, Uganda

<http://www.wougnet.org>

A monthly electronic newsletter with events, reports, resources, and organisations related to WOUGNET's mission to further the use of information and communication technologies among women in Uganda. You can subscribe to the WOUGNET Update Newsletter by filling out a form on their website, or send an email message to [info@wougnet.org](mailto:info@wougnet.org) with your request.



## **4. Journal contents by e-mail services**

An added service offered by journal publishers is e-mailing the contents list of each journal before publication. This service could alert you to articles published in journals you do not regularly receive so that you can access the article on the relevant webpage or via e-mail (if available) or order it from another source.

One example is:

### **ContentsDirect (Elsevier Science)**

<http://contentsdirect.elsevier.com>

ContentsDirect is an alerting service for Elsevier Science journals (and books), including *Social Science and Medicine*, *Information and Management* and *International Journal of Information Management*. Approximately two to four weeks before a journal issue appears in libraries, readers subscribing to ContentsDirect will receive the contents page of that issue via e-mail. You can subscribe by completing the form on the website, or if you only have e-mail, send an e-mail message to [CDsubs@elsevier.co.uk](mailto:CDsubs@elsevier.co.uk) giving your name, e-mail address, full mailing address, the book subject area(s) and journal title(s) for which you would like to receive the ContentsDirect service.

Other major journals offer this service themselves, and these can be subscribed to directly from their websites. Examples are:

### ***Journal of the American Medical Association***

<http://pubs.ama-assn.org/misc/alerts.dtl>

**E-BMJ**

<http://www.bmj.com>

The electronic version of the British Medical Journal.

**The Lancet**

<http://www.thelancet.com>

**Morbidity and Mortality Weekly**

<http://www.cdc.gov/mmwr>

You can subscribe to the table of contents (or the complete newsletter) by completing the form on the website. For further information or assistance, contact: [mmwrq@cdc.gov](mailto:mmwrq@cdc.gov)

**Weekly Epidemiological Record**

<http://www.who.int/wer>

Available in English and French. You can subscribe to the table of contents (or download the complete newsletter) on the website, or obtain the table of contents via email by sending a message to: [majordomo@who.ch](mailto:majordomo@who.ch) with the following in the body of the message: subscribe wer-reh

For further information or assistance, contact: [owner-wer-reh@who.ch](mailto:owner-wer-reh@who.ch)

### 6.9.3 On-line training

**Itrainonline**

<http://www.itrainonline.org>

ItrainOnline offers a single source on the web containing a selection of the best and most relevant computer and Internet training resources for development and social change. This site has sections on basic skills, strategic use of the Internet, web development, technical topics, resources for trainers, and resources for women.

**Leland Initiative Web Tutorial Series**

<http://www.usaid.gov/regions/afr/leland/tutorial>

Leland Initiative Web Tutorial Series. Ten lessons on creating web pages, from the basics to using web development software and good design practice.

**Yenza!**

<http://www.nrf.ac.za/yenza>

"Yenza" – which means "do it" in isiXhosa and isiZulu – is a guide to using the Internet for research and teaching in the Social Sciences and Humanities. Offers practical 'how to' information and links to useful resources on using the Internet for research, integrating the Internet into teaching, and how to build your own website. The information on this site should help both the novice researcher and the more experienced researcher to find and develop on-line resources. The site can be used independently by researchers, although it was primarily developed to complement face-to-face workshops. The section, *Yenza! For trainers*, contains resources for people wanting to run workshops using the site, and the entire Yenza! site can be downloaded in compressed form for running off-line.

### 6.9.4 Electronic conferences

Archives of the electronic conferences can usually be found on their related websites.

**AF-AIDS**

<http://www.hivnet.ch:8000/africa/af-aids>

Discussion and exchange of information and experiences on HIV/AIDS in Africa (in English and French). Subscribe directly from the website or send an e-mail message to: [af-aids@hivnet.ch](mailto:af-aids@hivnet.ch)

Type the word join in the subject line, leave the rest of the message empty.

**AFRO-NETS: African Networks for Health Research and Development**

<http://www.afronets.org>

The main purpose of the forum is to exchange information between the different networks active in health research for development in East and Southern Africa. A popular discussion forum for those interested in a range of health issues within Africa. Subscribe by completing the on-line form on the website or send an e-mail message to: [majordomo@usa.healthnet.org](mailto:majordomo@usa.healthnet.org)

In the body of the message type only: SUBSCRIBE afro-nets youremailaddress

Leave the subject line blank and do not include your signature at the end of your message. For further information or assistance, contact: [owner-afro-nets@usa.healthnet.org](mailto:owner-afro-nets@usa.healthnet.org)

**AHILA-Net**

<http://www.ahila.org/ahilanet.html>

AHILA (Association for Health Information and Libraries in Africa) has its own e-mail discussion list (set up by the WHO library) to allow health librarians, information workers and health information providing organisations, primarily in developing countries, to communicate directly with each other, sharing ideas and airing problems and experiences. To subscribe, send an e-mail message to: [bertrandi@who.ch](mailto:bertrandi@who.ch)

**Asialib**

<http://mailman.anu.edu.au/mailman/listinfo/asialib>

A discussion list on libraries in Asia. To subscribe, send an e-mail message to: [asialib@mailman.anu.edu.au](mailto:asialib@mailman.anu.edu.au)

**Paclib-l**

<http://mailman.anu.edu.au/mailman/listinfo/paclib-l>

A discussion list for Pacific libraries. To subscribe, send an e-mail message to: [paclib-l@mailman.anu.edu.au](mailto:paclib-l@mailman.anu.edu.au)

**E-drug: Essential Drugs**

<http://www.essentialdrugs.org>

An electronic forum to allow health professionals to share information about essential drugs, policy, programme activities, education and training. Available in English, French, Spanish and an India-specific version. Subscribe by completing the form on the website or send an e-mail message to: [majordomo@usa.healthnet.org](mailto:majordomo@usa.healthnet.org)

In the body of the message type only: SUBSCRIBE e-drug youremailaddress

Leave the subject line blank and do not include your signature at the end of your message. For the French version, substitute e-med for e-drug; or e-farmacos for Spanish. For further information or assistance, contact: [owner-e-drug@usa.healthnet.org](mailto:owner-e-drug@usa.healthnet.org)

**HIF-net at WHO**

<http://www.inasp.info/health/forum.html>

An email discussion list dedicated to issues of health information access in resource-poor settings. To subscribe, email your name, affiliation and professional interests to [health@inasp.info](mailto:health@inasp.info)

**ProCAARE: Program for Collaboration Against AIDS and Related Epidemics**

<http://www.procaare.org>

Aims to provide a forum for dialogue among clinicians, researchers, practitioners and policy-makers in both the industrialised and developing world who are engaged in the fight against the epidemic. Subscribe by completing the form on the website or send an e-mail message to:

[Majordomo@usa.healthnet.org](mailto:Majordomo@usa.healthnet.org)

In the body of the message type only: SUBSCRIBE procaare youremailaddress

Leave the subject line blank and do not include your signature at the end of the message. For further information or assistance, contact: [owner-procaare@usa.healthnet.org](mailto:owner-procaare@usa.healthnet.org)

**ProCOR: Global Electronic Conference on Cardiovascular Health in the Developing World**

<http://www.procor.org>

Aimed at addressing the emerging epidemic of cardiovascular diseases in the developing world.  
Subscribe by completing the form on the website or send an e-mail message to:  
Majorodomo@usa.healthnet.org  
In the body of the message type only: SUBSCRIBE procor youremailaddress  
Leave the subject line blank and do not include your signature at the end of the message.  
For further information or assistance, contact: owner-procor@usa.healthnet.org

#### **SEA-AIDS – an Asia Pacific e-mail link**

<http://www.hivnet.ch:8000/asia/sea-aids>

E-mail discussion and electronic information service aimed at linking those interested in building and shaping the response to HIV and AIDS in the Asia-Pacific region.

To subscribe, complete the form on the website or send an e-mail message to:  
healthdev@hivnet.ch

#### **TDR-scientists**

<http://www.who.int/tdr/kh/bitttdre.htm#tdr>

A networking forum for scientists formed as part of the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR). Especially sensitive to the needs of scientists from developing countries, the tdr-scientists serves as a networking forum for tropical disease research scientists everywhere.

To subscribe, email [majordomo@who.ch](mailto:majordomo@who.ch) and type the following in the body of the message:  
subscribe tdr-scientists

For further information or assistance, contact: owner-tdr-scientists@who.ch



### **6.9.5 Databases and other resources on CD-ROM**

#### **AIDS Action CD-ROM**

Aimed at health workers, educators and community workers, these resources provide practical information on a wide range of care, support and prevention issues concerning HIV, AIDS and sexually transmitted infections (STIs). The resources include training manuals, briefing papers and discussion guides. Also included are the international editions of AIDS Action, a newsletter that was produced by Healthlink Worldwide between 1987 and 2001. Regional editions of AIDS Action are still produced by Healthlink Worldwide's partner organisations. Contents of the CD-ROM are also available on the web at <http://www.aidsaction.info>

Available from: Healthlink Worldwide

Cityside, 40 Adler Street

London E1 1EE, UK

Tel: +44 20 7539 1570

Fax: +44 20 7539 1580

Email: [info@healthlink.org.uk](mailto:info@healthlink.org.uk)

Website: <http://www.healthlink.org.uk>

#### **African HealthLine (formerly African Health Anthology)**

A collection of bibliographic databases containing over 400,000 references, most with abstracts. All references cover relevant African health issues. Databases include: African Index Medicus (AIM), AIDSLINE, African subset of CAB Health database, African subset of MEDLINE, Source databases, and others.

Available from: National Inquiry Services Centre (NISC)

22 Somerset Street, PO Box 377

Grahamstown 6140, South Africa

Tel: +27 46 6229698

Fax: +27 46 6229550

E-mail: [info@nisc.co.za](mailto:info@nisc.co.za)

Website: <http://www.nisc.co.za/DataBases/DataBaseLinks/HEALTH.HTML>

#### **CAB Health**

Covers communicable diseases, tropical disease, parasitic disease and parasitology, human nutrition, community and public health, and medicinal and poisonous plants. Over 3,500 journal sources are scanned from more than 125 countries. Produced by CAB International. Also available via the web.

Available from: Ovid Technologies Ltd

Merlin House

20 Belmont Terrace

London W4 5UG, UK

Tel: +44 20 8585 6400

Fax: +44 20 8585 6640

Email: [europa@ovid.com](mailto:europa@ovid.com)

Website: <http://www.ovid.com>

### **e-TALC**

A collection of resources (newsletters, journals, teaching materials, factsheets) about many aspects of primary health care, primarily with a developing country focus. Contributors include AfriAfya, Cochrane Review, Community Eye Health Journal, NAM, Footsteps. Some are intended for a medical audience, others will be useful to community health workers.

Available from: e-TALC

PO Box 49

St Albans

Herts AL1 5TX, UK

Tel: +44 1727 853869

Fax: +44 1727 846852

E-mail: [e-talc@talcuk.org](mailto:e-talc@talcuk.org)

Website: <http://www.e-talc.org>

### **ExtraMED**

Contains the full text of around 300 biomedical journals from all over the world, mainly from developing countries. It was established on the initiative of the World Health Organization. Apart from its use by researchers in medical libraries, ExtraMED should also be of interest to hospitals and doctors in developing countries and elsewhere. Other target audiences include non-governmental and international development organisations, and multi-lateral and bi-lateral donor agencies and charitable organisations. Journals are presented as page images and are all indexed.

Available from: ExtraMED

Informania

PO Box 40

Petersfield

Hants GU32 2YH, UK

Tel: +44 1730 301297

Fax: +44 1730 265398

E-mail: [informania@supanet.com](mailto:informania@supanet.com)

### **Food and Nutrition Library**

Contains over 300 publications in the fields of food, nutrition, and food policy and nutrition research. Also available free on the web.

Available from: Human Info NGO

Oosterveldlaan 196

B-2610 Antwerp

Belgium

Tel: +32 3 448 0554

Fax: +32 3 449 7574

Email: [humanity@humaninfo.org](mailto:humanity@humaninfo.org)

Website: <http://www.humaninfo.org> or <http://www.nzdl.org>

### **Medical and Health Library**

The Medical and Health Library 1.0 was built in December 1999. It was jointly initiated by the Humanity Libraries Project (now called Human Info NGO), and the Payson Center for International

Development of Tulane University. It contains 210 publications – 30,000 pages of ideas and solutions – in the fields of clinical treatment, emergencies, essential drugs, family planning, food and nutrition, health education, HIV/AIDS, medical equipment, prevention, public health, research, and sanitation. Also available free on the web.

Available from: Human Info NGO (See Food and Nutrition Library above)

### **MEDLINE/PubMed**

The National Library of Medicine's (NLM) bibliographic database covering medicine, nursing, dentistry, veterinary medicine, and the pre-clinical sciences. Journal articles are indexed and are searchable, using NLM's controlled vocabulary, MeSH (Medical Subject Headings). References include the English abstract when published with the article. Also available via the web.

Available from: Ovid Technologies Ltd (see contact details for CAB Health above)

### **POPLINE (POPulation information onLINE)**

Provides worldwide coverage of population, family planning, and related health issues, including family planning technology and programmes, fertility, and population law and policy. In addition, POPLINE focuses on particular developing-country issues including demography, AIDS and other sexually transmitted diseases, maternal and child health, primary health care, communication, and population and environment. The database is produced by the Population Information Program at the Johns Hopkins School of Public Health. It is available free of charge to developing countries.

Available from: Population Information Program

Center for Communication Programs

Johns Hopkins School of Public Health

111 Market Place, Suite 310

Baltimore

Maryland 21202-4012, USA

Tel: +1 410 659 6300

Fax: +1 410 659 6266

E-mail: [POPLINE@jhuccp.org](mailto:POPLINE@jhuccp.org)

Website: <http://www.POPLINE.org>

### **T pics in International Health series**

Contains interactive tutorials, an image collection and a glossary of medical terms. Intended for use as training materials – providing interactive tutorials covering key topics on international health issues for the tropical diseases and health community. Subjects: acute respiratory infection, diarrhoeal diseases, HIV/AIDS, leishmaniasis, leprosy, malaria, schistosomiasis, sexually transmitted infections, sickle cell disease, trachoma, and tuberculosis.

Available from: CAB International

Wallingford

Oxon OX10 8DE, UK

Tel: +44 1491 832111

Fax: +44 1491 829292

E-mail: [publishing@cabi.org](mailto:publishing@cabi.org)

Website: <http://www.cabi-publishing.org/CDROM/TIH>

### **Women, Children and HIV: Resources for Prevention and Treatment**

Contains over 5,000 pages of text related to the prevention, diagnosis, treatment and care of HIV-infected women and children. Within each topic there are overviews, guidelines and policy analyses, community education information, research journal articles and reports, listings of organisations and related Internet sites.

Available from: HIV InSite

University of California

4150 Clement Street, Building 16

VAMC 111V - UCSF

San Francisco, CA 94121

USA

Fax: +1 415 379 5547

E-mail: [gshiv@hivinsite.ucsf.edu](mailto:gshiv@hivinsite.ucsf.edu)



Website: <http://hivinsite.ucsf.edu>



### 6.9.6 Databases on the Internet

Most of the following databases are available on the Internet free of charge, and also on CD-ROM (although most are not free of charge in this format).

#### **African Index Medicus (AIM)**

<http://www.who.int/library/country/regional/aim/index.en.shtml>

Bibliographic database compiled from a number of national databases of materials published in African countries on medicine and health, merged with records from WHO, MEDLINE, POPLINE and related databases.

#### **AIDSinfo**

<http://www.aidsinfo.nih.gov>

Catalogues trials of substances being tested for use against AIDS, HIV infection, and AIDS-related opportunistic diseases. Each record covers a single trial, and provides information such as title and purpose of the trial, diseases studied, patient eligibility criteria, contact persons, agents being tested, and trial locations. Sponsored by the FDA, the NIAID, the NLM, and the Centers for Disease Control in the US.

#### **CHID online (The Combined Health Information Database)**

<http://chid.nih.gov>

A bibliographic database produced by health-related agencies of the US government, providing titles, abstracts, and availability information for health information and health education resources. Covers sixteen topics: AIDS, STD and TB education, Alzheimer's, arthritis and musculoskeletal and skin diseases, cancer prevention and control, deafness and communication disorders, diabetes, digestive diseases, epilepsy education and prevention, health promotion and education, kidney and urologic diseases, maternal and child health, medical genetics and rare disorders, oral health, prenatal smoking cessation, and weight control.

#### **MEDLINE/PubMed**

<http://www.ncbi.nlm.nih.gov/PubMed>

The National Library of Medicine's (NLM) bibliographic database covering medicine, nursing, dentistry, veterinary medicine, and the pre-clinical sciences. MEDLINE is searchable through PubMed which also includes links to many sites providing full text articles and other related resources. Journal articles are indexed and are searchable, using NLM's controlled vocabulary, MeSH (Medical Subject Headings). References include the English abstract when published with the article.

#### **National Library of Medicine (NLM) Gateway**

<http://gateway.nlm.nih.gov>

The NLM Gateway allows users to search in multiple retrieval systems at the US National Library of Medicine (NLM). The Gateway searches MEDLINE/PubMed (journal citations, 1966 to present), OLDMEDLINE (journal citations, 1957-1965), LOCATORplus (catalogue records for book, serials, audiovisual materials), MEDLINEplus (consumer-orientated health and drug information), DIRLINE (directory of health organisations), AIDS Meetings (meeting abstracts on AIDS/HIV), Health Services Research Meetings (meeting abstracts on health services research), Space Life Sciences Meetings (meeting abstracts on space life sciences), and HSRProj (health services research projects in progress funded by the US government and private grants and contracts; provides access to information about research before results are available in a published form).

#### **POPLINE (POPulation information onLINE)**

<http://www.POPLINE.org>

Provides worldwide coverage of population, family planning, and related health issues, including family planning technology and programmes, fertility, and population law and policy. In addition,

POPLINE focuses on particular developing-country issues including demography, AIDS and other sexually transmitted diseases, maternal and child health, primary health care, communication, and population and environment. The database is produced by the Population Information Program at the Johns Hopkins School of Public Health.

**Source Bibliographic database**

<http://www.asksource.info/databases.html>

Provides free access to a unique collection of more than 20,000 records of materials focusing on the management and practice of health and disability in developing countries. References include books, reports, articles, and CD-ROMs held in the Source International Information Support Centre. Details of publisher or distributor of printed materials are given, and a link to the full text of materials available electronically on the Internet. Subject areas include adolescent and child health, disability, diseases and disease control, health communication, HIV/AIDS, information management, poverty and health, primary health care, reproductive and sexual health, training, and more.

The Source database includes what was known as the Healthlink Online database and has been formed from the merger of the resource centres of Healthlink Worldwide and the Centre for International Child Health, in collaboration with Handicap International UK.

**Source Contacts database**

<http://www.asksource.info/databases.html>

Allows users to search for organisations – including publishers, distributors, information providers, and training organisations – working in health and disability worldwide. This resource has been used as a valuable networking tool to learn about the activities of other organisations working regionally and internationally.

**Source Newsletters and Journals database**

<http://www.asksource.info/databases.html>

Allows users to search information on over 150 newsletters, magazines and journals related to health and disability, which are available free or at low cost to readers in developing countries. Links to the full text of newsletters are included if they are published on the web. This resource provides a rich source of core materials to build up resource centres and to provide up-to-date health information at little cost. It also lists a number of recommended titles available on subscription.

**WHOLIS (WHO Library Catalogue)**

<http://www.who.int/library/database>

Catalogues the complete collection of WHO publications, including periodical articles from WHO journals from 1985 to present, and the content of the quarterly bulletin of additions to WHOLIS, called WHODOC. The catalogue also provides access to the WHO collection on international public health and development. References are searchable using NLM's controlled vocabulary, MeSH (Medical Subject Headings).



## 6.9.7 Image collections on the Internet

**Clipart for Health Communication**

<http://www.hcmn.org/clipart>

A reference tool for health communications material development. The artwork in the database includes materials in the Media/Materials Clearinghouse, as well as art sent in from Health Communication Materials Network members from their own project work. Users can search the database, and use the images as models for developing their own illustrations. High-resolution images suitable for reproduction are not distributed. Each item is catalogued noting the producer, artist, country, subject, format (eg colour, black & white, line art, cartoon, photo), etc.

**DevArt: Artwork for Development**

<http://developmentart.com>

A collection of copyright-free, downloadable, publication-quality line drawings, drawn by professional artists in Asia and Africa. Access to and use of the artwork is free, but users are asked to credit the original artist.

### **International Labour Organization (ILO) On-line Photo Library**

<http://www.ilo.org/dyn/media/mediasearch.home>

A database of 1,500 images of developing countries. NGOs, institutions and journalists may search the database on-line and then request high-resolution copies of photographs by e-mail to Béatrice Mann ([mann@ilo.org](mailto:mann@ilo.org)).

### **MediaBase**

[http://www1.fao.org/media\\_user/\\_home.html](http://www1.fao.org/media_user/_home.html)

Over 3,000 images from the Food and Agriculture Organization of the United Nations, searchable by country, region, human content (eg 'parent', 'crowd') or subject (eg 'nutrition', 'forestry').

### **Media/Materials Clearinghouse (M/MC)**

<http://www.jhuccp.org/mmc/index.php>

A single interface for several databases of health communications resources: Mediabank for images of posters and other visual materials; Netlinks for links to websites, listservs and organisations; Photoshare for photographs; POPLINE for the latest documents. Hosted by the Johns Hopkins Center for Communication Programs.

## **6.10 Review of database programs**

Guidelines on selecting software for bibliographic databases are included in Section 6.8.5. This section looks in detail at three programs that are used by libraries and resource centres for bibliographic databases – WINISIS (the Windows version of CDS-ISIS), Idealist, and Inmagic (including Inmagic DB/Textworks). This review covers the latest versions of each program available at the time of printing (early 2003), plus the DOS version of Inmagic (called Inmagic Plus) as this is still a very useful program.

Each program is assessed separately on the basis of the aspects outlined in Section 6.8.5. The table at the end of this section compares all the main features of the three programs. The notes in this section provide additional information on some of the features, plus an element of evaluation.

Programs such as Access, dBase and Foxpro are sometimes used by libraries and resource centres. However, they are not covered, as they all have fixed field lengths and have no repeating field function, and, although flexible, they cannot easily be developed and updated by staff with non-technical skills. Filemaker Pro is on the borderline, as it has a repeatable field function, but does not have variable length fields.

### **6.10.1 Inmagic DB/Textworks (and Inmagic Plus)**

Inmagic DB/Textworks is an easy-to-use program that is suitable for large resource centres or those that need a database to support a range of activities. Inmagic Plus is the DOS version and Inmagic DB/Textworks is the Windows version. Both were developed by Inmagic Inc., Woburn, Massachusetts, USA.

Inmagic DB/Textworks is quite expensive, but is quick to learn and can perform a wide variety of activities. Inmagic Plus has the flexibility of the Windows version, but none of the very recent developments. Inmagic Plus is no longer developed or supported, but along with the Library Guide (a set of pre-defined databases including catalogue, orders, users, and loans), is available as freeware for those who do not require support.

The term Inmagic is used when discussing both programs in this chapter. The individual names DBTextworks and Inmagic Plus will be used to discuss the individual programs.

**Program suitability** Inmagic is designed for use with bibliographic data, as well as other textual and numeric data. A number of calculation functions are available both within and across records.

**Repeatable fields and variable length fields** Inmagic has variable length fields and the ability to repeat fields.

**Searching** Inmagic has the facility for both simple and expert searching (see table at the end of this section).

**Flexibility** Inmagic is very flexible, both in relation to the initial design process, and in making alterations. It is easy to add and remove both fields and indexes, with these changes taking effect across the database. It is also straightforward to change field names and record structures.

**How easy to set up and develop** Databases can be designed and managed in Inmagic without technical computer knowledge, although technical support is useful if resource centre staff are not very familiar with computers or databases.

Inmagic can use either name-based or numeric field tags, and can replace these with different field labels as required. It is the most flexible of the programs in this respect. Name-based field tags make it more user-friendly when designing a database, and number-based field tags are useful if wanting to use standard bibliographic database formats, although the lack of a subfield function means that it cannot be fully compatible with standard formats.

**Data entry assistance** Inmagic provides all the data entry assistance functions described in Section 6.8.5 (see table at end of this section).

**Indexes (inverted files)** Inmagic can index fields by word or term (whole fields), and can use more than one type of indexing for any field at the same time (such as word and term), enabling index terms to be viewed as both individual words and phrases. Inmagic has individual indexes for each field, although these can easily be searched as multiple indexes.

**Sorting** Complex options for sorting are available, including sorting a record by an alternative field when a particular sort field is missing, such as sorting by title when there is no author.

**Display, print and download formats** DBTextworks uses simple 'box placing' (placing field 'boxes' in the required layout) or 'drag and drop' (using the cursor to drag and place field boxes in the required layout) to set up formats for displaying, printing and downloading (writing to file). Text, images, punctuation and formatting can be added to all of these, and reports can be saved as rich text format (RTF) and in hypertext mark-up language (HTML) for placing records as text on a website. Added text can be set to appear only if the field contains data. It is also possible to include 'sort' and 'report' headers and footers to develop more creative formats. These make it very useful for producing resource lists and directories. Label printing functions are available and mail merge can be done relatively easily, either by exporting records or creating a report format.

DBTextworks records can include links to documents and graphics files and website addresses. Facilities are built in to display graphics and to open listed documents and websites.

Designing formats using Inmagic Plus is more complex, although not too difficult. However, formats cannot utilise RTF, or be saved as HTML, although it is possible to add HTML codes into 'write-to-file' formats, and change the TXT extension to HTM after saving.

**User interface** DBTextworks has a user-friendly interface with on-line help. Inmagic Plus is a menu-driven interface, but still user-friendly.

**Languages** DBTextworks is currently available in English, French and Spanish. Inmagic Plus is only available in English.

**Importing and exporting to other programs** All popular formats are available (see table at end of this section).

**Hardware requirements** Inmagic does not require a high specification to work at a satisfactory pace. However, it is important to note that with all databases, the size of fields, and the number of fields indexed will have as much effect on the speed of the program as the number of records in the database.

**Software documentation** The manual for DBTextworks is comprehensive, clear, well illustrated and well indexed. A manual is no longer available for Inmagic Plus.

**Support services** Support for commercial programs such as DBTextworks can usually be arranged through a contract with a local supplier, depending on availability. Support services are also increasingly accessible via e-mail and the Internet. Inmagic Plus is no longer supported.

For more up-to-date information about DBTextworks, see the website below, which also includes trial versions of the software that can be downloaded after applying for a password.

<http://www.inmagic.com>

**Details of distributors** are available from the support page on the website, which also includes access to a 'Technical Support Knowledge Base', which is a searchable database of questions and answers to common support questions.

<http://www.inmagic.com/support.htm>

**E-mail Newsletter** The *Inmagic Digest* is published quarterly and provides details of new features, training and news. It can be subscribed to from the following address, which also provides access to the newsletter archives:

<http://www.inmagic.com/newsletters.htm>

**User groups** Inmagic has strong user groups in the UK and USA. There is a mailing list to which questions and comments can be sent.

To subscribe send a message to: [inmagic-users-request@inmagic.com](mailto:inmagic-users-request@inmagic.com)

With the message: SUBSCRIBE

After subscribing, use the following address to send messages to the list: [Inmagic-users@inmagic.com](mailto:Inmagic-users@inmagic.com)

In addition, the UK user group has a website: <http://www.ukiug.com>

**Cost factors** Remember that the total cost of a program includes training, technical support, and time for staff to familiarise themselves with the program, as well as the price of the software. DBTextworks is user-friendly and has an excellent manual, so only a few days training is needed in the use of the program. However, general computer skills are important, as is an understanding of databases, how they work and what they can be used for.



## 6.10.2 Idealist

Idealist is an example of a program that was originally intended for personal use, but is very suitable for small resource centres. Other examples are Reference Manager and Procite, which

have several pre-defined database structures and print formats, but not all the functions listed in Section 6.8.5.

Idealist can do most things required by a small resource centre, or a large resource centre that mainly requires a catalogue database. It is not so useful for producing printed materials such as resource lists. However it is inexpensive and easy to use.

**Program suitability** Idealist is designed for use with bibliographic, as well as other textual and numeric data. Calculation functions are limited to within records, and are not very easy to use.

**Repeatable fields and variable length fields** Idealist has variable length fields and the ability to repeat fields.

**Searching** Idealist has the facility for both simple and expert searching (see table at end of this section).

**Flexibility** Idealist is flexible, both in relation to the initial design process, and in making later alterations. It is easy to add and remove both fields and indexes, with these changes taking effect across the database. It is also straightforward to change field names and record structures.

**How easy to set up and develop** Bibliographic databases can be designed and managed in Idealist without technical computer knowledge, although technical support is useful if resource centre staff are not very familiar with computers or databases.

Idealist uses name-based field tags, which makes it user-friendly when designing databases.

**Data entry assistance** Idealist provides all the data entry assistance functions described in Section 6.8.5 (see table at end of this section). However, it is limited to a single glossary for substitutions. The validation/value list function (which is called the vocabulary list) is useful for pasting in terms and controlling vocabulary used in fields, but only accepts or rejects individual words rather than phrases, and therefore cannot provide full control for fields such as keywords.

**Indexes (inverted files)** Idealist can only index by word, and has one index for all fields of the database. However, it can highlight terms appearing in a specified field.

**Searching** Idealist offers all the standard search functions, although only the basic Boolean searching is straightforward: combining searches with AND is called narrowing the searching, and using OR is called widening the search. It has a synonym search function, which is useful for retrieving synonyms of the search term, particularly in fields such as title or abstracts. It also has a cross-reference searching function that retrieves all records that contain any selected word or the current record.

Sorting Idealist is not limited in the number of sort levels, and has a number of complex options, but cannot sort on an alternative field if the specified field is empty – for example, sorting by title if there is no author.

**Display, print and download formats** Idealist uses the same on-screen layout for data entry and viewing records. Layouts can be re-designed, but this is time-consuming and not necessary. Idealist uses box placing for print formats only. Text can be added, but as field and text boxes in the print formats are of fixed length, true bibliographic formats cannot be produced. To download records using Idealist, simple export formats are used. These cater for variable length fields, and text and punctuation can be added. However, it is not possible to add formatting such as rich text format (RTF), and added text will appear for each record even if the field is empty. It is possible to include hypertext mark-up language (HTML) codes into the export format, for placing records as text on a website. Both label printing and mail merge functions are available. Idealist can link to and display graphics files and link to and open document files and websites.

**User interface** Idealist has a user-friendly interface with on-line help.

**Languages** Idealist is only available in English.

**Importing and exporting to other programs** Idealist can import and export data in all the popular formats (see table at end of this section).

**Hardware requirements** Idealist does not require a high specification to work at a satisfactory pace. However, it is important to note that as with all databases, the size of fields, and the number of fields indexed will have as much effect on the speed of the program as the number of records in the database.

**Software documentation** The manual that comes with Idealist is comprehensive, well illustrated and well indexed, although the summarising at the beginning and end of each section can be confusing.

**Support services** Support for commercial programs such as Idealist can usually be arranged through a contract with a local supplier, depending on availability. Support services are also increasingly accessible via e-mail and the Internet.

The Idealist developers, Bekon, provide support free of charge to purchasers of version 3 onwards from: [idealist@bekon.com](mailto:idealist@bekon.com)  
or <http://www.bekon.com>

The website includes information about the software, frequently asked questions and a demonstration version of the software for downloading.

**User groups** At present there are no user groups.

**Cost factors** Remember that the total cost of a program includes training, technical support, and time for staff to familiarise themselves with the program, as well as the price of the software. Idealist is user-friendly and has an excellent manual, so only a few days' training is needed. However, general computer skills are important, as is an understanding of databases, how they work and what they can be used for.

### 6.10.3 CDS-ISIS for Windows (WINISIS)

CDS-ISIS for Windows or WINISIS as it is sometimes known is a non-commercial program developed by UNESCO and collaborating organisations, and distributed by a network of national distributors. WINISIS is widely used in developing countries due to its low cost and flexibility. It is a low-cost program, and is useful for all sizes of resource centre, and those that need to produce resource lists and other outputs. However, it takes some time to learn the more complex features, such as the formatting language.

**Program suitability** CDS-ISIS is designed for use with bibliographic data, as well as other textual and numeric data. Calculation functions are limited, as the sister program IDAMS is designed to undertake these.

**Repeatable fields and variable length fields** CDS-ISIS has variable length fields and the ability to repeat fields.

**Searching** CDS-ISIS has the facility for both simple and expert searching (see table at end of this section).

**Flexibility** CDS-ISIS is very flexible, both in relation to the initial design process, and in making later alterations. It is relatively easy to add and remove both fields and indexes, with these changes taking effect across the database. It is also straightforward to change field names and record structures. However, CDS-ISIS is not always easy to use, especially in relation to database

design and the need to learn a formatting language for indexing and print/display formats. WINISIS has solved some of the more difficult aspects of the old DOS version, such as database design, but not the formatting language.

**How easy to set up and develop** CDS-ISIS for Windows is easier to design and manage than the DOS version of CDS-ISIS, but initial and follow-up training and support (see information about user groups below) is still recommended for those without strong computer skills, and to understand the formatting language used for designing print/display formats.

CDS-ISIS uses number-based field tags. This, along with the ability to subdivide fields, enables it to use standard bibliographic database formats. For ease of use, the numeric field tags are replaced by name labels for data entry, editing, and searching.

**Data entry assistance** CDS-ISIS only offers half the data entry assistance functions described in Section 6.8.5 (see table at end of this section).

**Indexes (inverted files)** CDS-ISIS can index fields by word or term (whole fields, and subfields), and can use more than one type of indexing for any field at the same time (such as word and term), enabling index terms to be viewed as both words and phrases. Although CDS-ISIS only indexes the first 30 characters of any term, important words or phrases in titles, abstracts and so on can also be individually selected for indexing. It is also possible to search for terms that are not indexed, using more complex command-based searching.

CDS-ISIS has one index for all fields of the database, although it is possible to display separate listings for each field.

**Searching** CDS-ISIS offers all the standard search functions. It also offers the ANY search function (any terms defined as linking with the search term will be retrieved). This can be used to provide synonym search functions, but it is more widely used to provide a 'broader' or 'exploded' search function. For example, ANY Africa can retrieve records including the name of any African country; ANY disease and ANY therapy can respectively retrieve all records relating to different diseases, or different types of therapy.

**Sorting** Complex sort options are available, including sorting fields by an alternative field when a sort field is not present, such as sorting by title when there is no author.

**Display, print and download formats** CDS-ISIS can produce complex display and print formats including the addition of text, punctuation and formatting. Added text can be set to appear only if the field contains data. This makes it very suitable for producing resource lists and directories. However, it takes time to learn how to create good formats in CDS-ISIS, as the program uses a complex formatting language. CDS-ISIS can also link to and display graphics files, and link to and open document files and websites. Label printing is possible, and mail merging can be done by creating a relevant download (save-to-file) format.

**Download / save to file formats** Records can be saved to file for later printing in plain text format that requires formatting to be added using a word processor. The Beta version 1.422 offers the option to save records using hypertext mark-up language (HTML), but this still requires the addition of HTML coding as part of the formatting language.

**User interface** CDS/ISIS has a user-friendly interface with on-line help.

**Languages** CDS-ISIS is currently available in English, French, Spanish, and an Arab enabled version with full Arabic support for inverted file and search functions, and mixed language support (English/French and Arabic).

**Importing and exporting to other programs** CDS-ISIS uses the international standard for data exchange as its primary import and export format. However, the add-on conversion programs – ImpExp2709, IsisAscii v 0.92 and XML2ISIS (all available from the UNESCO site) – enable import



in most standard formats including XML. Exports in formats other than the International Standard (ISO2709), eg comma delimited or tagged, require the creation of a relevant download (save-to-file) format.

**Hardware requirements** CDS/ISIS does not require a high specification to work at a satisfactory pace. However, the database size would be an important consideration for the size of the hard disk and memory, and the processor speed. As with all databases, the size of the fields and the number of fields indexed will have as much effect on the speed of the program as the number of records in the database.

**Software documentation** The manual that comes with the Windows version of CDS-ISIS is only an update of the DOS manual, which has always been too technical for most users. A number of useful guides to CDS-ISIS are listed in the Further Reading section, including the comprehensive and relatively non-technical 'CDS-ISIS for Windows handbook' that can be downloaded from the UNESCO ftp site:

<ftp://ftp.unesco.org/pub/winisis/windows/doc/english>

Guidelines are also available from national CDS-ISIS user groups, and other groups, such as those submitting records to African Index Medicus (AIM).

**Support services** Training and support for CDS-ISIS is offered by national distributors, user groups, regional documentation and information systems, and library schools. Support and training is also offered by consultants, but this is usually more expensive.

Information about CDS-ISIS can be obtained from the UNESCO website, which includes details of national distributors, and related websites and resources:

<http://www.unesco.org/webworld/isis/index.html>

Information about the Arabic version is available from:

Arab League State Information and Documentation Centre (ALDOC)

PO Box 11642 Tahrir Square

Cairo, Egypt

Tel: +202 575 05 11 / +202 575 29 66

Fax: +202 574 03 31

E-mail: [aldoc2k@menanet.net](mailto:aldoc2k@menanet.net) or [shfoaad@idsc.net.eg](mailto:shfoaad@idsc.net.eg)

**User groups** CDS/ISIS user groups exist in many countries, although their strength varies. E-mail discussion lists are also available. Discussion groups can produce a lot of messages daily, so before joining one, find out whether your local user group is a member, as they may be able to ask questions for you, and forward answers to you.

**International discussion group** This includes discussions in English, Spanish and occasionally other languages. If you cannot understand Spanish, it is a good idea to say so when sending your messages, to prevent receiving replies that you cannot understand.

To subscribe send a message to: [listserv@nic.surfnet.nl](mailto:listserv@nic.surfnet.nl)

With the message: subscribe cds-isis [FIRST NAME] [LAST NAME]

For example: subscribe cds-isis Jane Smith

Messages to the CDS-ISIS discussion group are archived and can be searched from the following Internet site:

<http://listserv.surfnet.nl/archives/cds-isis.html>

**Cost factors** Remember that the total cost of a program includes training, technical support, and

time for staff to familiarise themselves with the program, as well as the price of the software. CDS-ISIS is usually free, or low cost (for example, the cost of disks, manual and initial training). However, CDS/ISIS requires much more training, both initial training and follow-up, than many other programs, and the time taken to get used to the program can be a large additional cost.

But CDS-ISIS is widely used in developing countries, and if it is used in your country, more people will already know how to use it. New staff may not need training or familiarisation time, if they have already used CDS-ISIS elsewhere.

Features	DBTextworks (Version 6), and Inmagic Plus	Idealist (Version 5)	WINISIS (Version 1.4)
Program suitability			
Type of program	Database	Text retrieval	Text retrieval
Designed for bibliographic use	Yes	Yes	Yes
Variable length fields	Yes	Yes	Yes
Repeatable fields	Yes	Yes	Yes
Option not to allow repeatable fields	Yes	No	Yes
How easy to set up and develop			
Easy to set up	Yes	Yes	Yes
Easy to develop	Yes	Yes	Yes
Field identification (tags/names)			
Name	DBTextworks only	Yes	For data entry, editing, searching
Number	Yes	No	Yes
Data entry assistance			
Set up different data entry screens	Yes	Yes	Yes
Record templates/skeletons	Yes	Yes	Yes
Default field values	No	Yes	Yes
Field templates or input masks	Yes	Yes	Yes
Substitution lists	DBTextworks many	Single glossary only	No
Pick lists & pasting from index	Yes	Yes	Yes
Validation/value lists	Yes	Yes	Yes
Spell checking	Yes	Yes	No
Context specific data entry help	No	No	Yes

Control over which fields must contain data	Yes	Yes	Yes
Editing			
Full screen editor	Yes	Yes	Yes
Edit record range	Yes	Yes	Yes
Edit search set	Yes	Yes	Yes
Batch/Global add/delete field	Yes	No	Yes
Batch/Global editing - field specific	Yes	No	Yes
Find and replace - non field specific	DBTextworks only	Yes	No
Copy & paste in and across records	Yes	Yes	Yes
Copy & paste in and across databases	DBTextworks only	Yes	Yes
Indexes			
Word	Yes	Yes	Yes
Term (whole field)	Yes	No	Yes
Selected word/phrase	No	No	Yes
More than one type at once	Yes	No	Yes
Index all fields	Yes - Inmagic Plus first 50 only	Yes	Yes
Number of characters indexed	250	66	30
Individual field indexes	Yes	No	Display only
Multiple field index	For searching only	Yes	Yes
Highlight specific field terms in multiple index	No	Yes	Yes
Searching			
Browse indexes	Yes	Yes	Yes
Paste terms from index into search	Yes - multiple	Yes	Multiple
Phrase searching	Yes	Yes	Yes
Boolean searching	Yes	Yes	Yes
Proximity and Adjacency searching	Yes	Yes	Yes
Synonym searching	No	Yes	Using ANY function
Wildcard/Truncation searching	Yes	Yes	Yes

Mark records for printing	Yes - drop unwanted records	Yes	Yes
Cross-reference searching	No	Yes	No
Cross database searching	DBTextworks - linked only	Yes	No
Searching non-indexed fields	No	No	Yes
Saved search sets	Yes	No	No
Sorting			
Number of sorting levels	5	No limit	4
Alternative sort field if primary field is empty	Yes	No	Yes
Display, print and download formats			
Box placing	DBTextworks only	Yes - printing only	No
RTF supported	DBTextworks only	Yes - for printing, displays	Display, print, copy and past only
HTML supported	Yes - Inmagic add to print format	Yes - add to export format	Yes - need knowledge of HTML
Displaying graphics	DBTextworks only	Yes	Yes
Opening documents and websites	DBTextworks only	Yes	Yes
Calculations supported within records	Yes	Yes, not easy	Yes - not easy
Calculations supported across records	Yes	No	No
Data protection			
Distribution version	Yes	No	Yes
Web search module	Yes - at a cost	No	Yes - as add on programs
Passwording	Yes	Yes	Yes
Importing/exporting to other programs			
How easy	Easy	Easy	Easier with add on programs
Delimited ASCII, tagged, formatted	Yes - Inmagic using report formats	Yes - Inflected and .DBF	Import via IsisAscii - Export via report format
XML	Yes - DBTextworks only	No	Import using XML2ISIS - Export report
International standard	Yes	No	Yes

Hardware Requirements			
Memory	Inmagic 640k, DBTextworks16mb+	16mb+	16mb+
Processor	Inmagic 386+, DBTextworks Pentium	Pentium	Pentium
Operating system	Inmagic 3+ DBTextworks 95+	Windows 95+	3.1+
Minimum free hard disk space	Inmagic 3mb DBTextworks10mb	8mb	10mb
Network system (if used)	Novell, Windows NT	Novell, Windows NT	Novell, Windows NT
Database size			
Maximum number of records	200 gigabyte +	1 million	16 million
Maximum number of fields	Inmagic 76, DBTextworks250	160	200
Software documentation			
User manual quality	DBTextworks very good, Inmagic Plus not available	Very good	WINISIS good, but only a supplement
Availability of alternative manuals	No - but not necessary	Yes - but not necessary	Yes - necessary and very good
Help function	Yes - good	Yes - good	Yes - good
Support services	DBTextworks only	Yes	Yes via user groups and email lists
User Groups			
Established user groups	Yes	No	Yes
User e-mail discussion lists	Yes	No	Yes
Cost factors			
Price	£1,295 (UK quote) US\$975 (RSA quote)	£176	Free/Nominal fee for materials
Low cost search only version	No	Yes - £132	Not necessary
Free distribution version	Yes	No	Yes
User support	Support contracts available at a cost + user groups	Free	User groups + email lists only
Training	Limited required	Limited required	Initial and follow up required
Other cost factors	Software upgrades	Software upgrades	Familiarisation time